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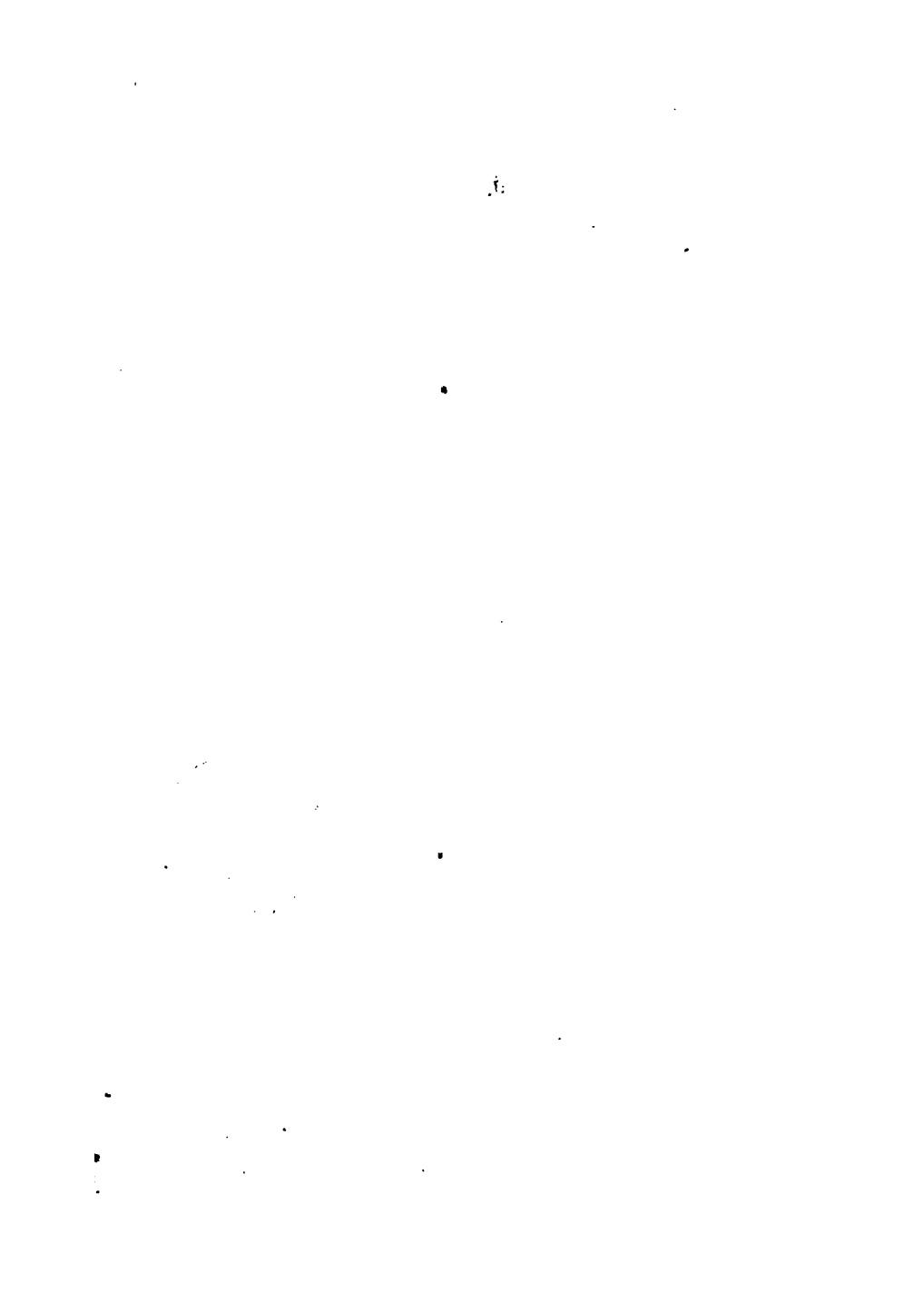


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PATENTS FOR INVENTIONS.

ABRIDGMENTS

OF

Specifications

RELATING TO

BRICKS AND TILES.

PART II.—A.D. 1861-1866.

PRINTED BY ORDER OF THE COMMISSIONERS OF PATENTS.



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1871.

176 : a



P R E F A C E .

THE Indexes to Patents are now so numerous and costly as to render their purchase inconvenient to a large number of inventors and others, to whom they have become indispensable.

To obviate this difficulty, short abstracts or abridgments of the Specifications of Patents under each head of Invention have been prepared for publication separately, and so arranged as to form at once a Chronological, Alphabetical, Subject-matter, and Reference Index to the class to which they relate. As these publications do not supersede the necessity for consulting the Specifications, the prices at which the printed copies of the latter are sold have been added.

The number of Specifications from the earliest period to the end of the year 1866 amounts to 59,222. A large proportion of the Specifications enrolled under the old law, previous to 1852, embrace several distinct Inventions, and many of those filed under the new law of 1852 indicate various applications of the single invention to which the Patent is limited. Considering, therefore, the large number of Inventions and applications of Inventions to be separately dealt with, it cannot be doubted that several properly belonging to the group which forms the subject of this volume have been overlooked. In the progress of the whole work such omissions will, from time to time, become apparent, and be supplied in second or supplemental editions.

This volume is a continuation of the "Abridgments of Specifications relating to Bricks and Tiles," already published, and brings the Abridgments to the end of the year

1866. From that date the Abridgments have not been published in classes, but will be found in chronological order in the quarterly volumes of the "Chronological and Descriptive Index" (see List of Works at the end of this book). It is intended, however, to publish these Abridgments in classes as soon as the Abridgments of all the Specifications from the earliest period to the end of 1866 have appeared in a classified form. Until that takes place, the reader (by the aid of the Subject-matter Index for each year) can continue his examination of the Abridgments relating to the subject of his search in the Chronological and Descriptive Index.

This series comprises the inventions relating to the different varieties of bricks and tiles, together with those referring to the materials from which they are manufactured, the methods of forming them, and the various contrivances for drying and burning them; it also includes inventions for manufacturing artificial building blocks of various forms and dimensions. Inventions for indurating or protecting the face of bricks or tiles, and inventions relating to the manufacture of drain tiles, are also included in this series. A limited number of the present Abridgments mainly relate to improvements in building contrivances or materials, and to other inventions which will form, or have formed, the subjects of distinct series. They have been, however, included because some portion of them refers to bricks or tiles.

The Abridgments marked thus (* *) in the following pages were prepared for another series or class, and have been transferred therefrom to this volume.

B. WOODCROFT.

January, 1871.

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[The names printed in *Italics* are those of the persons by whom the inventions have been communicated to the Applicants for Letters Patent.]

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INTRODUCTION.

IN the first volume of Abridgments of Specifications relating to Bricks and Tiles, inventions patented from the earliest period down to the end of the year 1860 were included, and it seemed appropriate that the Introduction to such a collection should embrace a view of the nature and history of the whole subject, so far as it could be compressed into a few pages. The present volume includes none but recent inventions, or at least none but such as have recently been made public, for the Specifications abridged (excepting those forming the Appendix) data from A.D. 1861 to 1866 inclusive. These Abridgments may perhaps be suitably prefaced by a few observations on the manufacture and employment of bricks and tiles at the present day, and especially in Great Britain.

The last few years have witnessed a great activity in the production of bricks, but no very marked or very general alteration in their dimensions, quality, or mode of manufacture. It had been believed that the Excise restrictions, which practically confined the manufacturer of bricks to one size and shape, operated injuriously, and that their removal would be followed by a large demand for bricks of various sizes and shapes, and in other respects different from the well-known average bricks of the country. This anticipation, generally speaking, has not been at all realised. The repeal of the duty has led no doubt to increased supply and demand, but it has not been followed by any such general introduction of moulded, or glazed, or perforated, or unusual sized bricks as was at one time expected. The old dimensions of 9 inches long, $4\frac{1}{2}$ inches wide, and $2\frac{1}{2}$ inches deep, continue to be looked on as the average standard of size, which probably may not be widely departed from for many years. Bricks of this size and shape have formed the mass of the solid walling of which the engineering and architectural works of the last quarter of a century have largely consisted; and in practice they are found very convenient for use, though probably a somewhat thinner

brick, more resembling that used by the Romans, might make sounder work, especially in walls of moderate thickness.

The hand-made brick has by no means been superseded, though at the same time the manufacture of machine-made bricks has undoubtedly increased; and the use of fine varieties of clay prepared with care so as to give a good surface, has been to some extent stimulated. To a limited degree moulded, perforated, ornamented, and glazed varieties of bricks have begun to be manufactured and employed, but the demand for them can hardly be said to be large compared with that for the common sort.

The last few years have witnessed a growing disposition in this and in some continental countries to employ that refined description of brickwork known as *terra cotta* in buildings having a claim to good architectural character. In London especially, where almost all varieties of building stone give way sooner or later before the trying atmosphere to which they are exposed, this material has been gaining ground, and though it cannot be said yet that it is extensively in demand, its recent use in certain conspicuous public buildings is likely to cause it to become more generally appreciated and employed. Two somewhat distinct modes of treatment have been followed by those who have used *terra cotta* for the "dressings" or enriched portions of brick buildings. In some cases it has been so carefully manipulated and worked upon by hand, during the process of manufacture, as to be capable of showing almost all the varieties of finish and depth of under-cutting, and all the sharpness and straightness of line and surface which belong to masonry. So treated, *terra cotta* becomes in effect, a durable description of artificial stone, especially when manufactured in large blocks. The new buildings for Allyn's College at Dulwich may be referred to as forming a very recent and complete example of this mode of employing the material. In the second mode of treatment, the ornaments and mouldings executed in *terra cotta* are confined to what can be cast in a mould or run through a die, and no attempt at hand finishing or under-cutting is thought of. The ornamental work so produced is necessarily inferior in accuracy and effectiveness to that obtainable upon the other method, but it possesses a distinctive character of its own, appropriate to a plastic material, and it is distinguishable from stonework. The recently erected buildings at South Kensington, especially the Royal Albert Hall, may be referred to as good examples of this mode of treatment. Which-

ever of these modes of finishing is adopted the use of terra cotta enrichments for buildings, if it becomes general, will probably stimulate the production of the best class of moulded bricks and facing bricks, since these enrichments almost necessitate the use of brick for the general face of the building of which they furnish the decorative features.

A considerable business is now carried on in the manufacture of paving bricks for various purposes, and the number of patterns and qualities introduced, especially for use in stables and coach-houses, is very large. The importation of "Dutch clinkers" for the paving of stables still, however, continues, none of the various substitutes made in this country having wholly superseded them in the opinion of many judges. From clays of a somewhat similar character to those which furnish paving bricks, it is now customary to manufacture very hard blocks and bricks, of special shapes, for use in drains, culverts, and other works where strength and an impervious face are required. Without going further into detail it may suffice to say that in smaller or larger quantities, almost every description of bricks and blocks which have ever been used or can be required, either for useful or ornamental purposes are now procurable in this country of excellent quality and workmanship, though in many cases the demand being slight, the supply is limited of articles which seem as if they might be very extensively useful were they only better known. Should any circumstances stimulate the demand for superior and ornamental brickwork there can be little doubt that British manufacturers are able to supply the materials for executing it to any extent and of any degree of excellence.

The manufacture of coloured tiles for paving is among the arts which have been revived in this country as a consequence of the revival of Gothic architecture in the present century. Not only have the old patterns and colours been successfully imitated, but new modes of manufacture have been introduced, which have secured great excellence combined with rapid production. Tiles of all degrees of richness, from plain squares of a single colour up to the most elaborately enriched specimens, sometimes decorated in relief and glazed are now largely made. They are being employed for wall-decoration and various other purposes, as well as for paving, and they constitute an important and increasing manufacture abroad as well as at home. Some varieties of ornamental tiles recently imported, show that conti-

mental manufacturers are bestowing great attention upon these articles, and are producing qualities different from those commonly made in England.

It would be an omission not to refer here to the recent use of this description of tile, to furnish, in the shape of "tesserae," the material for mosaics to be employed in external and internal decorations; this may perhaps never rise to the importance of a distinct branch of manufacture, but it is an interesting development of the art of the tile maker, and promises to render possible the artistic decoration of large surfaces, in a way which without this material, could not have been attempted.

The subject of roofing tiles does not call for much remark. The use of them has been for many years largely superseded by the very general employment of slate; and though they are still manufactured in considerable quantities no great success seems to have attended such attempts as have been made to bring into notice roofing tiles of unusual shape, size, or material. Even as regards ornamental ridge tiles and finials, the manufacture of which has been stimulated by the same movement which revived that of paving tiles, there is no very prominent circumstance to notice. Roofing tiles, like ornamental brickwork, seem still to offer a field for enterprise and energy to develop all the improvement of which they are undoubtedly capable, and to bring them into general use.

Two subjects, not at first sight closely allied, will be found by the readers of this volume to have occupied the attention of inventors, by whom they have been generally combined; the protection of bricks and other building materials from the effects of weather, and the manufacture of blocks from artificial stone. These constantly form part of the same invention; principally because the same materials which are used to close the pores of defective bricks and stones may be employed to cement together the particles of which artificial building materials are composed. Artificial stone though it is proposed as a material for bricks by some inventors, may be more appropriately discussed in connection with other Specifications, but the effectual induration of the surface of brickwork, if a practical success can be obtained by any of the inventors who have made it their object, would be one of the most valuable contributions which science could render to the art of the builder, and its importance seems to have been recognized by several inventors. The destructive effects of moisture and frost

and coal smoke upon stonework, especially when, executed in the oolitic stone so largely used of late years, have attracted the attention of various inventors, who have proposed in different ways to protect such materials from damage, and have many of them at the same time extended their inventions to bricks and brickwork: in fact looking at the vast amount of brickwork executed, as compared with masonry, and the serious inconvenience, loss, and damage to health occasioned by the porous nature of walls built with pervious bricks, it can hardly be doubted that the effectual protection of the surface of a brick wall from moisture is an object fully as important as the induration of soft stone.

In the great majority of instances it will of course doubtless happen that circumstances will not admit of any indurating or water-proofing process being made use of, and however this may be it will always be the wish of the builder to be supplied with bricks of the best quality which the clay in his neighbourhood can be made to furnish; it may consequently not be unserviceable here to point out in what the excellence of really good bricks is held to consist. A very practical and exhaustive inquiry into the bricks of Manchester was made in the year 1868 by a committee of the Society of Architects in that city, and their published report on the subject* contains, in addition to a large amount of local information, many practical remarks of universal application.

The committee consider that "bricks of good quality should be
" a uniform size, say 9 in. by 4½ in. by 2½ in., and should weigh
" at the rate of about 110 lb. per cubic foot, or about 7 lb. each."

"They should be rectangular, with true faces, and only the
" sides and ends need be smooth; the arrises should be sharp
" and straight. No print sinking on either face."

"They should not absorb when saturated above 20 per cent. of
" their bulk of water, and should absorb it reluctantly and part
" with it with facility at ordinary temperatures."

"They should be uniformly burned and have a metallic clang
" when struck together."

"They should be tough and pasty in texture, and not granular
" so as to require repeated blows to break them, rather than one
" hard blow. Superiority in this respect will cause the bricks to
" retain their entirety and sharpness of their arrises in carting and
" handling."

* See "The Builder," Oct. 24, 1868.

This report in describing the means to be taken to ensure the excellence of the manufacture dwells especially upon the necessity of careful preparation of the material; variation in the size of moulds to suit the different rates of shrinkage proper to each sort of clay, so as to produce perfectly uniform sized bricks from various clays; the use of material of such consistency as not to become misshapen by the effects of its own gravity; care, shelter, and careful handling in the process of drying; and such means of burning as shall keep the amount of firing under control.

In order to test the absorbent powers of several descriptions of brick six different varieties were tried by being placed on edge in $\frac{3}{4}$ in. of water, when all the specimens but one became saturated for all practical purposes in 14 hours, some specimens becoming so in $2\frac{1}{2}$ hours. The quantity of water absorbed by a brick varied from 8 oz. to $20\frac{1}{4}$ oz., and was not, as might have been expected, in inverse ratio to the density; in fact in these experiments one of the heaviest specimens proved the most absorbent. The rapidity with which the water was taken up varied very remarkably and apparently capriciously, and when exposed to the atmosphere at a natural temperature, the bricks which parted most eagerly with their moisture at first were found to be the longest drying, and vice versâ. At the end of eleven days none of the bricks were perfectly dry, from $\frac{1}{2}$ oz. to $1\frac{1}{4}$ oz. of water being retained. The quantity of water absorbed by bricks when totally immersed corresponded very nearly to that absorbed through one edge as above described, but it was noticed that the majority of the bricks when immersed absorbed the water more rapidly at their sides than at their top and bottom beds, as shewn by the air-bubbles; this seemed to the experimentors to point to the desirableness of applying pressure in moulding in a different direction from the usual one, namely, not on the beds, but on the face or end of the brick.

The Manchester committee left their investigation incomplete in one most important particular, as they did not consider it requisite to determine by actual experiment the strength of the varieties of brick submitted to them. The following table shews the average of the results of recent experiments conducted with every appliance that can ensure accuracy by Mr. Kirkaldy. The number of experiments with each variety of brick is stated in the table, but in the majority of the cases four specimens were tested.

INTRODUCTION.

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SUMMARY of RESULTS of EXPERIMENTS made to ascertain the Resistance to Thrusting Stress of Terra cotta and of Bricks.

Description.	No. tested.	Cracked slightly.		Cracked generally.		Crushed, Steel-yard dropped.	
		Per Square Inch.	Per Square Foot.	Per Square Inch.	Per Square Foot.	Per Square Inch.	Per Square Foot.
Staffordshire blue brick.	Four -	Lbs. 5,921	Tons. 380·8	Lbs. 8,365	Tons. 538·0	Lbs. 9,753	Tons. 627·9
Blashfield's Terra-cotta M.G.	" -	5,258	337·8	6,044	388·2	6,723	431·8
Blashfield's terra-cotta C.T.A.	" -	3,702	237·5	4,941	317·0	5,587	359·0
Staffordshire red brick.	" -	1,832	117·8	2,158	138·8	2,890	185·8
Burnham wire-cut	Five -	1,151	74·0	1,857	119·4	2,459	158·1
Worcester pressed	Four -	1,010	65·0	1,913	123·0	2,170	139·5
Worcester "Builders."	" -	872	56·1	2,088	134·2	2,418	155·5
London best stock	Five -	940	60·5	1,577	101·4	2,141	137·7
Runcorn red brick	Four -	735	47·3	1,351	85·9	1,762	113·3
Burnham pressed.	Five -	708	45·5	1,355	87·1	1,597	102·7
London common stock.	" -	739	47·5	1,196	76·9	1,564	100·6
Warrington red brick.	Eight	428	27·5	668	42·9	924	59·4

All were bedded between pieces of pine half an inch thick. Bricks having recess were filled with Portland cement.

It is of course true that the strength of masses of brickwork especially if built in mortar and if loaded within a short time of being erected cannot be expected to approach that of the bricks tested separately; but under exceptional conditions and with the best kinds of cement that strength might be almost reached; and on other grounds, as for example to judge of the durability and the probable resistance of bricks to friction, vibration, or shocks, to which they are exposed when employed in paving, in railway works, and in drainage, it is of the greatest importance to know the actual strength of an average specimen of any description proposed to be made use of; just as the amount of water which bricks will take up and the rapidity or slowness of their absorption of it will indicate the degree of their fitness for exposure to weather.

BRICKS AND TILES.

1861.

A.D. 1861, January 10.—N° 63.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from Pierre Antoine Collard.*)—(*Provisional protection only.*)—"The object of this invention is to utilize volcanic deposits or substances, such as lava, pozzolano, and the like."

"In order to utilize these volcanic matters they are first pulverized or reduced, if not already sufficiently small, and are fused, either by themselves or mixed with fluxes, after which they are reduced to powder, and may be used as a glaze or coating for various substances, or may be moulded or run under heat alone or under heat and pressure into various objects, such, for instance, as tables, slabs, mantelpieces, architectural ornaments, blocks for building, tiles, tablets, and others."

[Printed, 4d. No Drawings.]

A.D. 1861, January 25.—N° 199.

HUGHES, EDWARD THOMAS.—(*A communication from Léon and Edouard Pavin de Lafarge.*)—An apparatus for pulverizing clay preparatory to making bricks, tiles, or earthenware vessels forms the subject of this invention, which apparatus is also applicable to grinding or pulverizing grain, stones of fruit, dye woods, and similar articles." This machine consists of a strong upright framework, "at the top of which is fixed a receiver and hopper to receive the material to be crushed. Inside this frame is a number of revolving blades or cutters, which bruise or crush the material into coarse pieces, and then allows them to fall to another set of blades or crushers, but of a finer description," sometimes followed by a third set, sometimes not. The material "falling through the last into a receiver ready for use." The cutting blades are arranged in an oblique position on the inner faces of two circular metal discs bolted on to the cheeks of a

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metal drum or boss fixed to a horizontal shaft, to which rapid rotary motion is given. The discs have slots in them, in proximity to which the cutters are fixed. The hoppers feed material into an annular space, of which the two discs may be considered the side walls and the drum the central boundary, the circumference being formed by a fixed metal block fitted closely to the hopper and the discs. Opposite to the hopper this space is closed by a metal plate having cutters adjusted to its outer edges. Thus the material can only escape from the space between the discs by passing through the slots in the discs themselves, "and as the drum" revolves the material is drawn against the cutters or blades on "the plate" opposite the hopper, and "thus the chisels or blades" on the discs and the cutters or blades on the plates act as chisels "and triturate or pulverize the material which passes through the" openings above the cutters from the interior to the exterior of "the discs." The position of the blades is adjustable, and as the cutters on the plate are nearer to or further from those on the discs and from the edges of the slots in the discs, the material will be finely or coarsely pulverized.

[Printed, 1s. 2d. Drawings.]

A.D. 1861, January 30.—N^o 241.

COURTOIS, ALEXANDER, and DE SOULANGE, JEROME ERNEST.—(*Provisional protection only.*)—An improved construction of brick kiln. This kiln is to be brick built, and vaulted, and so lined with fire-brick "as to form vertical gutters extending" from the sole or bed partly to the top of the vault, where a "suitable draught is created by two or more chimneys." At the sole a brick floor with interstices or perforations is laid, and the fire-grate is at a suitable distance below.

[Printed, 4d. No Drawings.]

A.D. 1861, February 5.—N^o 297.

WILLIAMS, GEORGE.—Improvements in the construction of charcoal kilns form the subject of this invention; but one portion of it relates to "the form or shape of brick blocks or lumps and" means of securing the same by dowels for the construction of "distillation shafts," to form part of such kilns. These bricks *are formed of fire-clay; each one has a rectangular hollow from its*

upper to its under face, and is rebated or socketed at top and bottom; consequently they may be accurately fitted one on to another, "so that when built up an air-tight shaft is formed which," observes the inventor, "I bind together by dowels or other arrangements at the ends or sides."

The shafts are so placed that the ends of the bricks in adjoining shafts are in contact, and the ends accordingly have channels formed in them to receive dowels; on some of them, projections are also to be moulded or otherwise formed, which projections are intended to carry horizontal partitions.

[Printed, 10d. Drawing.]

A.D. 1861, February 23.—No 470.

SPENCER, THOMAS.—This "invention refers to machinery or "apparatus in which the direct action of steam, water, or air is "used for forcing the plastic material into moulds, or to other "apparatus which in like manner forces the said material therein "from an external supply;" a patent for such machinery having been granted to this inventor April 10, 1848, No. 12,115. Several of the heads of this Specification do not refer to bricks or tiles, but among them occur—

2. The use of moulds "for earthenware generally, including "bricks and slabs, with a roughened interior," produced "by "casting, or by raising or indenting the surface, or by lining the "mould with cloth, leather, or other suitable materials," or else by making the moulds of cast metal and using them rough from the sand, or if made true, roughening them with a file. With these moulds talc, oil, or other lubricant is to be used, unless the covering be of cloth or similar material, in which case "it may be "removed with the articles and then stripped off."

9. "Applying moulds without the usual dod" or core at the mouth of the clay cylinder beyond which the mould is placed. After illustrating his mode of so forming hollow articles, the inventor shows that it is adapted to the forming of solid earthenware or bricks, in effecting which the brick "mould is made in "halves," as described under other heads of the Specification, "so as to slide in guides," and is divided cornerwise of the brick.

[Printed, 10d. Drawing.]

A.D. 1861, February 27.—N° 506.

TAYLOR, JOHN, junr.—Roofing and ridge and also coping tiles, form the subject of this invention.

1. The tiling for roofs "is similar in principle to what is known as Italian tiling," in which flanged tiles are first laid, and then the joints protected by a covering tile, usually semicircular. In this invention a "trough-formed" or flanged tile, slightly wider at one end than at the other, and with a portion of the flange cut away next the narrow end, is used for the under "trough," or "channel tiles," and also forms, when inverted, the covering or "capping tile."

"The form of the tiles will allow the edges of the inverted tiles to descend down so as to bear from end to end on the bottoms of the trough tiles on either side." Each tile has a stop on its face to catch the edge of the tile below, and in place of a nail hole has a notch at each edge, by means of which it can be secured to the roof with hook-formed nails; the vertical rows of trough tiles are shewn on the drawings as fixed at the right distance asunder to allow of the capping tiles fixing on to them.

The ridge tiles are also flanged and of two patterns, fitting to the capping and channel tiles, and intended to be used alternately. Ridge tiling of similar flanged construction, but made to fit a plane surface, is to be used for slated roofs.

The coping tiles are flat; they rest on the walls only at the joint, where they are thicker than elsewhere. One edge of each tile, at the joint, is grooved to receive the plain edge of the adjoining tile; this groove also acts as a kind of transverse gutter for water. These tiles can be moulded, burnt, and transported two together. Any material found suitable may be employed for any of the tiles forming the subject of this Specification.

[Printed, 1s. 6d. Drawings.]

A.D. 1861, March 11.—N° 597.

BUNNETT, JOSEPH.—The "improvements," which form the subject of this invention "relate to the manufacture of bricks, tiles, and similar articles of a superior description, and consist in a novel method of treating and preparing the clay, and in the machinery employed for forming and perfecting the finished article."

They comprise—1. Tempering the clay "by pugging or grinding it in contact with steam," and either completing the process

of preparing it for immediate use in a second pugmill, or doing all in one mill.

2. A "pressing machine, which consists of a drum revolving within a cylindrical casing." The material is fed into the back of the casing, and moveable pistons actuated by "eccentric guides" are projected from the periphery of the drum which take hold of the material and force it round "towards a front opening furnished with a plain or moulded die." At this orifice the clay "meets a stop, which prevents it from travelling farther round the drum and compels it to pass through the moulding orifice. As the pistons reach this point the eccentric guides cause them to be withdrawn into and lay flush with the periphery of the drum, to be again projected as they approach the feeding hopper." In simpler forms of the machine the drum with moveable pistons is replaced by "a cam having three or more arms or wipers," which carry the clay round, and the fixed stop is replaced by a moveable one, caused (in some machines by an eccentric guide, in others by the pressure against it of the wipers themselves, combined with the force of a spring) to move in and out so as to keep always in contact with the surface of the arms or wipers. The moulded clay is to be cut up into proper lengths after leaving the die.

3. A "portable press for perfecting the newly made bricks or tiles." In this press is a brick mould of which the sides and ends are moveable, and kept open by springs; the soft brick being placed in this mould a hollow presser is forced down upon it by a screw which directly compresses the brick at top and bottom, and at the same time embraces and draws together the sides of the mould, causing them to compress the sides and ends of the brick. When the screw is turned back the presser rises, "the mould expands," and the brick can be "lifted ready for removal" by working a treddle.

[Printed, 8d. Drawing.]

A.D. 1861, March 14.—N° 626.

COOMBE, JAMES CANE, and WRIGHT, JAMES.—Preserving stones, bricks, slates, wood, &c., from weather, and improvements in mortar, cement, and artificial stone.

The inventors claim,—1. "The exclusive use of fluo-silicic acid, for the purpose of ~~indurating~~ and preserving stones, bricks, slates, wood, and other analogous materials."

2. "The exclusive use and application of precipitated silica in the manufacture of cements and mortars, whether employed for building purposes or in the manufacture of artificial stone, terra cotta, and such like materials."

When using the acid for indurating and preserving building materials the inventors propose either to impregnate them "with a solution of lime, magnesia, or other alkaline earth" as a preliminary or not, "according to their respective compositions." The solution of fluo-silicic acid is to be applied by washing it over the surface, or immersing the article in it, or by hydraulic pressure or otherwise, and combines "with any salt or any alkaline earth, which is present naturally in the stone, or with any alkaline earth which is artificially introduced into its substance, and forms with it an insoluble compound." In applying the second part of their invention they mix "the precipitated silica which is obtained during the manufacture of the hydro-fluo-silicic acid," with such materials of the mortar, &c. as contain "alkaline earths for which silica has an affinity." They do not confine themselves to the details of the Specification, or claim any mode of manufacturing fluo-silicic acid or silica, or any "methods of impregnating the materials to be operated upon."

[Printed, 4d. No Drawings.]

A.D. 1861, March 27.—N^o 764.

GRIMSHAW, WESTON.—"Improvements in machinery and apparatus used in drying, pulverizing, and compressing clay and other materials," which improvements consist of, 1. "Heating, by means of steam or otherwise, the crushing rollers."

2. "Apparatus for drying clay and other materials as it passes from the crushing rollers to the brick-making machine," being an improvement on the invention described in the Specification of the same inventor, dated A.D. 1860, October 20, N^o 2562. The apparatus for carrying out these two parts of the invention contains two pairs of rollers, made hollow and heated, between which the clay passes; after leaving these, it is broken up by "spike rollers" and allowed to drop on to a series of endless belts; these belts carry it to and fro repeatedly within a heated chamber, and at last discharge it into the pulverizing machine or elsewhere. The inventor, however, observes "that the form of the apparatus may be considerably modified, the object being to expose the clay or other material to a great heat."

3. In the pulverizing machine forming part of the invention described in the Specification of Joseph Lewis, A.D. 1857, September 26, N° 2484, substituting for studs projecting from the plates between which the clay has to pass, "concentric and "eccentric grooves and rings" on the plates themselves. "The "intersections of these rings and grooves form the grinding teeth "of the mill."

4. "Imparting two or more separate compressions to the bricks "or other articles to be moulded at one stroke of the piston rod, "as described" below.

5. "Improved modes of applying pressure to both sides of the "brick or other article while in the mould, as described."

Two arrangements of apparatus for carrying out the fourth and fifth parts of the invention are described. In both the rising of the piston of a steam cylinder gives direct pressure from below. In the first arrangement the moulds are ranged round a rotating table; the piston head has three steps at increasing heights, and these act simultaneously on three plungers operating upon these moulds. The "first step gives a preliminary compression," "the second step gives the final compression, and "the third step raises the brick or other article partly out of the "mould;" its removal is completed by inclined planes, as described in the Specification of this inventor and Ellis Rowland, A.D. 1853, September 7, N° 2060. A piston opposite the step which "gives the final compression" and worked by levers is caused to descend as the steam piston ascends, whereby "the "final compression is given simultaneously on both sides of the "brick."

In the second arrangement there are two moulds or sets of moulds; having plungers below them, in a table to which a to-and-fro motion is given by any convenient means. A set of moulds having been charged and brought perpendicularly over the steam cylinder its piston is caused to rise, and acting on the mould plungers gives at first a preliminary pressure; but continuing to rise, a part of it catches and raises the entire mould table, and thus forcing the contents of mould against a fixed beam, pressure is exerted upon the upper surface of the brick by projections on that beam. The same motion of the steam piston actuates a lever which removes the completed bricks from the companion set of moulds. During the horizontal motion of the moulds from the

piston to the hoppers where they are charged, "bowls" projecting from the mould plungers come in contact with inclined planes, and the plungers are thereby drawn down.

[Printed, 1s. Drawing.]

A.D. 1861, March 30.—N^o 793.

SIMPSON, THOMAS. — (*Provisional protection only.*) — "The object of this invention is so to arrange apparatus that after a brick has been moulded in the ordinary manner mechanical pressure may be applied thereto before removing it from the mould, thus forming a brick mould and press in combination." The inventor prefers to communicate this pressure by means of "a suitably formed lever" "brought down so as to compress the brick." After the lever is removed the brick is lifted out of the mould "by means of a lever or treddle" to be "connected with a pallet at the bottom of the mould." A screw or other mechanical means of exerting force, and pressure directed upwards, or lateral pressure, may however be used in place of what is above described.

[Printed, 4d. No Drawings.]

A.D. 1861, March 30.—N^o 796.

BRIGGS, JOSEPH. — (*Provisional protection only.*) — This invention relates to a compound substance "to be used as the coating or covering for stone, bricks, wood, or metal;" or to form the material of flags, blocks, bricks, &c.

Coal pitch, lime, and clean gravel, sifted through an inch sieve, are the materials. The pitch is to be melted by heat, and first the lime and then the gravel added, the proportions being about "one of pitch, one-tenth of lime, and five of gravel." Blocks made of this are to be sunk or dowed at the edges for joining together; and joints are to be made by using a "heating pan" to heat adjoining edges and then pouring in liquified cement hot. In making cement for this purpose hot sand is substituted for the gravel.

In coating bricks they are to be first heated; and the inventor proposes "to use with the pitch, or as a substitute for it, tar, asphalt, dead oil, or any other similar cheap material."

[Printed, 4d. No Drawings.]

A.D. 1861, April 3.—N° 820.

BLANCHARD, MARK HENRY.—This invention refers to the manufacture of articles principally for use in buildings, and including bricks and tiles, “from terra-cotta, stoneware, and plastic clays;” and embraces, first, “forming or shaping the same in moulds so constructed and operated with as to leave chambers or passages” in the substance of the article, with the intention of preventing its distortion while being burned. These moulds are so constructed that moveable iron rods are placed in them during the process of filling the mould, and lie in the clay; these rods being subsequently drawn out leave the passages required; but “for blocks and tiles for buildings,” and for some other purposes, the material is to be forced through dies, the hollows being produced by cores fixed in the dies.

2. A mode of “manufacturing, ornamenting, and “inlaying” various articles, including “slabs and tiles,” from the above materials. These articles, made with perforations, as above, are also to have the surfaces proposed to be ornamented indented or ornamented with hollows, which after the article has been burned, are to be filled in “with coloured vitreous clays, marbles, stones, wood, metals, scagliola, suitable cement or material, vitreous and other colours;” or the surfaces may be prepared by roughening for fresco painting, painted, and then burned, and if required glazed, the article being either burned entire or first cut into small pieces.

3. “Manufacturing posts, standards, and uprights” from the same materials.

[Printed, 1s. 10d. Drawings.]

A.D. 1861, May 1.—N° 1093.

WALTON, WILLIAM.—Blocks to form a “facing for walls, to be used in combination with ordinary bricks,” form the subject of this invention.

These blocks are of an L shape, in section, one part of each block being intended to form the facing of the wall, the other part projecting at right angles from it being to be built into the wall, and both parts being of such dimensions as will work in with ordinary bricks. The upper edge of the facing block is bevelled externally, the lower edge internally, and at a more acute angle, so that the mortar joint at that part is wedge shaped, with its thin edge external.

The projecting part may be grooved to give a hold for mortar and perforated longitudinally. "These perforations will form a continuous passage, which may be used for the reception of telegraphic or other wires," as, for example, bell wires, or for the purposes of ventilation."

[Printed, 8d. Drawing.]

A.D. 1861, May 10.—N° 1188.

MAULBON, ALEXANDRE LOUIS EDM.—(*A communication from Jacques Félix.*)—"Improvements in machinery or apparatus for manufacturing tiles" form the subject of this invention. In this machine four lower moulds are "fixed by a hinge upon" a horizontal "turntable." These receive each in turn the clay for one tile, and the necessary compression is given by an "upper mould," caused to descend and rise again from time to time by the action of an eccentric. Between each descent of the upper mould the turntable is turned through a quarter of a revolution, so as to bring a fresh lower mould under the upper one. A "moveable table or feeder" forms part of the machine; its object is to bring forward a fresh piece of clay as each mould becomes ready to receive it.

The combination of mechanical arrangements employed to cause the successive motions of the "upper mould," the "turntable," and the "feeder," appear to be considered as part of the invention. The motions of the upper mould are given by an eccentric; the intermittent motion of the turntable by a "balance catch," carried on a pinion and so contrived as to act upon arms carried by the same vertical shaft which supports the turntable. The "feeder" appears to be intended to slide to and fro, to be drawn back by a lever, and brought forward by the action of a weight shewn on the drawing; but the description and the drawing alike fail fully to explain its action and its situation with respect to other parts of the machine. Motion is to be communicated from one part to another partly by shafting and gearing, partly through connecting rods and levers.

[Printed, 6d. Drawing.]

A.D. 1861, May 20.—N° 1280.

FORSTER, WILLIAM CHARLTON.—"The application of glazing or vitrifying mixtures to the interior of bricks or slabs," as as

"to render them perfectly impervious to damp," and yet to retain the ordinary exterior surface.

The articles are to be made of any required form, perforated if preferred, and of the usual materials, but in separate halves shaped to fit together. After being partially dried apart, the halves are to be placed together, and the drying completed. When ready for burning the halves are to be separated; one of certain "glazing mixtures" is to be applied to the corresponding faces of the halves of the article; "they are then to be united and burnt in the ordinary manner."

"The glazing mixtures are to be composed of different materials, according to the clay used in manufacturing the bricks or slabs," it being essential that the glaze shall vitrify with the degree of heat required to burn the clay. The ingredients and proportions of three glazing mixtures suited for use upon fire-clay, a fourth upon earthenware clay, and a fifth upon common clay, are all given in the Specification. Pulverized clay, pulverized cornish stone, powdered glass, powdered red lead, powdered felspar, and powdered barytes are the materials from among which the ingredients of these glazes are selected.

These bricks are to be introduced as a damp course into existing buildings, or may be used in new buildings.

[Printed, *4d.* No Drawings.]

A.D. 1861, May 29.—N^o 1344.

HALE, THOMAS, and WALL, ARTHUR.—(*Provisional protection only*).

This invention relates, 1, to the construction and arrangement of furnaces; and 2, to "improvements in the preparation, manufacture, and treatment of clays, and of articles, surfaces, structures, and erections, subject to the action of fire or atmospheric influence." The inventors "add to the clay in process of manufacture a preparation," made as follows:—A mixture of powdered asbestos and pumice-stone is first placed in a furnace or crucible, "and while there muriate of soda is added." "When sufficiently heated," the mass is taken out, pounded, and mixed with pulverized magnesia and bone-dust, and is ready for use. Or, further, a paste may be made of the above powder with water, and with or without some glutinous matter and carbonate of soda or of potash, and this paste may be used to

coat bricks or structures "of clay (whether treated as above mentioned or not), earthenware, stone, or metal."

[Printed, 4d. No Drawings.]

A.D. 1861, June 1.—N° 1376.

BILON, LOUIS, and NAPPEY, JEAN ETIENNE JERÉMIÉ.—(*Provisional protection only.*)—"Improvements in apparatus for "manufacturing bricks and tiles," contrived to perform the following series of processes:—"Roughly shaping the clay into "blocks, to be thence placed in the revolving pan, leaving which "with three level sides it is acted upon by the clay-cutting saw "or knife, and so finished, when it may be dried and baked as "in ordinary "brick making.

1. The clay is levelled roughly on a platform or table, and then forced through a network of wires spaced to form "parallelograms the size of bricks." These cut the sheet into "irregularly shaped blocks of clay, one side of which is level, viz., that "which rests upon the platform."

2. These blocks are removed to a revolving table, where they are arranged in rows, the smoothed side downwards. A "forked lever" is caused continuously to travel round the whole table, "striking the whole of the bricks successively, which thus "smooths two more of their sides."

3. A row of the bricks is to be arranged side by side on a table as wide as the bricks are long. "An iron wire attached to "handles" is now moved along guides over them, and smooths the fourth side of each. A second row of bricks is added, the guides are suitably raised, and the wire is passed along as before. When the machine is quite full, "the edges" [ends?] "of the "bricks" "are smoothed by means of a knife, which is caused to "traverse along the end surface of the rectangular table."

"The several apparatus" to be combined "so as to form one machine."

[Printed, 4d. No Drawings.]

A.D. 1861, June 3.—N° 1390.

DAVIDGE, JOSEPH DANIEL.—(*Provisional protection only.*)—"Improvements in the shape of bricks or stones or other materials to be used in arches or vaults, so that when built into a curved structure the pieces shall be self-supporting. This the inventor proposes "to effect by making two sides of one of the pieces to

"be employed in the construction of a double wedge shape, pointed at one end and square at the opposite end." The block to be placed next this one to be "of corresponding shape to the sides of the aforesaid double wedge-shaped piece," so that the two shall fit together. It is added, that "by this invention the shaped materials are built up from the face of the work instead of the crown thereof, as heretofore commonly practised."

[Printed, 4d. No Drawings.]

A.D. 1861, June 4.—N^o 1407.

STANDFAST, SAMUEL.—"An improved composition for building, to be used in substitution for brick and stone, and an improved method of constructing walls, &c." The "composition is formed by first mixing up" "burnt clay or loam, iron dust, brick rubbish, gravel, lime, cement, and vegetable fibre, animal hair, and sand in proportions which may be varied according to circumstances," "to a proper consistence with water," and is then run into blocks of any given size or shape. "When this composition is run in the block mould, iron hooping and wire are introduced into the body of the composition in order to form in addition to the fibre a key."

Walls and roofs are to be constructed by the help of "hollow frames or moulds formed of" "wood or metal," into which the materials are run, "and which are raised as the building proceeds." Iron hooping and wire are to be introduced to compact the whole. The materials having set, the moulds may be removed.

The ingredients may be varied to suit different localities, and "according to the thickness, height, and position of the walls to be erected, but" the "frames or moulds are indispensable." On removing the moulds, the inventor finishes the face with "some of the ingredients enumerated in my composition, or otherwise."

[Printed, 4d. No Drawings.]

A.D. 1861, June 6.—N^o 1437.

PLATT, JOHN, and RICHARDSON, WILLIAM.—"Improvements in machinery or apparatus for making bricks."

1. The first part of this invention has "reference to screens or sifters" "for clay in brick-making machinery." The improvement "consists in directing a blast of air from a narrow opening

"against the outward surface of the said sifter or screen so as to keep the mesher clear."

2. "Forming the top die or mould of brick-making machines in two portions so as to be capable of moving independently of each other," thus leaving "a slight opening for the escape of air." One of the methods of applying this part of the invention is described and shewn on the drawings. The central portion of the die is there shewn as loose and "capable of moving upwards or downwards (to a certain extent)" within the outer portion. The ram is also formed in two parts, connected together but free to move to some extent, and the stroke of the lower part of the ram having driven the die down upon the clay, the further descent of its upper part is caused to force the loose or central portion of the top die "slightly downward into the clay beyond the first part."

There are within the ram springs which when the pressure of the upper part of the ram is taken off operate "to raise the lower portion of the die or mould" before the whole is lifted off.

[Printed, 6d. Drawing.]

A.D. 1861, June 20.—No 1590.

LESUEUR, ANTOINE NICOLAS.—"Improvements in the manufacture of pannels of ceramic or pottery ware," such as are commonly called wall tiles.

This inventor forms his tile with "two grooves or mortices cut in dovetail in the back." Their direction may be transverse, vertical, or otherwise, and they are to be "taken out of the thickness" of the tile. The objects proposed to be secured are greater economy of material and rapidity of manufacture as compared with tiles which have strips added to their backs, a better hold on the plaster, the occupying less space in the kiln "where they may be placed edgeways," and an economy of "heat required to bake them, in consequence of the diminished quantity of material used in their foundation."

The drawings shew the mode of arranging these tiles in the kiln, and also the shape of a "small brick or saggar" which is used along with them to hold them in place in the kiln, and which has projections that enter the grooves in the tiles and which appears to form part of the invention.

[Printed, 10d. Drawings.]

A.D. 1861, June 20.—N° 1592.

HODGSON, CHARLES.—“Improvements in the manufacture of fuel from peat, and in apparatus employed therein, parts of which are applicable to the moulding of bricks, tiles, and other like materials.”

1 “Compressing peat, coal, or other material in a dry state without heating the same.”

2. “Retaining a number of blocks under continued pressure in the same machine at the same time for the purpose of completing their solidification.”

3. “A supplementary tube” added to the dry peat compressing machine for which Letter Patent were granted to the same inventor, A.D. 1858, Dec. 10., No. 2837. This tube is to be about 18 inches long, and attached to the “untapered tube” in that machine, and is to be of metal, “split by longitudinal slots into two or more parts throughout the whole length or a portion of the length.” “One or more screw clamps or other contrivances for pressing together the sides of this tube are affixed outside” to increase, prolong, or vary at pleasure the pressure upon “the advancing and already solidified, or partially solidified,” contents.

[Printed, 4d. No Drawings.]

A.D. 1861, June 22.—N° 1607.

JOHNSON, JOHN HENRY.—(*A communication from Sylvain Tolijon.*)—“Manufacturing tiles or paving blocks required to be hard and durable from a composition of hydraulic lime and sand suitably prepared, and pressed into the desired form by mechanical pressure.” “The hydraulic lime is first broken into fragments of about the size of ordinary road metal, and laid evenly on layers,” watered till it begins to slack, and then covered with a layer of sand; on this another layer of lime is laid “and so on with any desired number of alternate layers of hydraulic lime and sand.” The mass should stand about 45 days, and must then be thoroughly mixed, sifted, moulded, and compressed. The articles so formed are to be aired for three days, then dipped in water and thoroughly dried during about two months, when they are ready for use.

Coloured or black tiles may be formed by mixing colouring matters with the material. These tiles “are intended to be laid in a similar manner to ordinary tiles with common mortar, after

" first steeping them in water for about ten minutes immediately before laying."

[Printed, 4d. No Drawings.]

A.D. 1861, June 25.—N° 1625.

STEVENS, CHARLES.—(*A communication from Louis Frédéric François David.*)—"An improved brick-making machine." In this machine the moulds are arranged in a horizontal cast-iron table called by the inventor a "bottom plate," which is placed on a vertical shaft and is capable of rotary motion. In each mould "there is a pressing block which moves up and down" therein.

An arm of iron "having the form of a sector" resting on the bottom plate, and centered on the vertical shaft, receives from a steam engine, or horse power or other prime mover, a to and fro motion: during each forward motion it carries the "bottom plate" on with it through part of a revolution, but the plate remains stationary during its backward motion. The moulds are filled from a table, and the forward motion of the bottom plate carries those of them which are exactly under the "sector" over "a dead roller or pulley" which drives up the pressers in the moulds and compresses their contents against the under side of the "sector."

"When the arm moves back," leaving the bottom plate stationary, "a jointed gear-work separately shown on the drawings," "causes a cast-iron presser to act upon the upper surface of the "brick;" this presser also derives its motion from that communicated to the "sector."

The completion of the rotation of the "bottom plate" carries the moulds first over an ascending incline which, forcing up the "pressing blocks" ejects the brick, then over a descending incline which draws down the pressing blocks, and lastly to the table where they are refilled.

[Printed, 10d. Drawing.]

A.D. 1861, July 5.—N° 1713.

ENGLAND, WILLIAM.—(*Provisional protection only.*)—Bricks of an improved shape.

These bricks are to be moulded "in such form that no mortar-bed or joint is perceptible upon the face of the work, a rebate "or flange upon two edges of the brick concealing the joint."

Bricks with the opposite edges differently rebated, and also bricks of two patterns to be used alternately, are shown as different applications of the invention.

[Printed, 4*l*. Woodcuts.]

A.D. 1861, July 9.—N° 1738.

BARFF, FREDERICK SETTLE.—“The induration or preservation of stone, bricks, tiles, cements, or other analogous absorbent substances or materials, as also the manufacture or production of artificial stone,” are the objects of this invention, which consists in employing for the above purposes “the alkaline silicates, combined with the aluminate of potash or other suitable reagent in such proportions as to allow sufficient time to elapse for manipulating the said solution,” and for its penetrating the pores of the substances to be acted upon.

For an indurating solution, “one part of an aqueous solution of aluminate of potash as nearly neutral as possible, sp. gr. 1,130,” and “formed by dissolving in water alumina and potash previously ignited or fused in a reverberatory furnace,” is mixed with three parts of silicate of potash, sp. gr. 1,040. In the actual mixing the silicates must be poured into the aluminates.

The surface to be operated on is to be cleansed, dried, and freed from dust, and then the solution (which is to be used within four or five hours of being mixed, or if kept corked within 10 or 12 hours) is to be applied by brushes or otherwise till it ceases to be absorbed. If found porous the surface may receive repeated applications at intervals of 24 hours.

For artificial stone the above solution is to be “combined or incorporated with proportionate quantities of powdered pumice stone or other like material,” moulded to the required shapes, and then dried without heat.

[Printed, 4*l*. No Drawings.]

A.D. 1861, July 24.—N° 1860.

SEITZ, ADOLF JULIUS DIEDRICH. — (*Provisional protection only.*)—A drying room for bricks and other articles manufactured from clay. The room is to have openings in its ceiling for the escape of the moisture thrown off by the articles, “benches constructed of porous materials to receive the bricks or other articles,” and “a system of pipes,” running under the benches.

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"heated (by preference) by means of the waste steam from the steam engine, as being more economical; but a separate boiler may be employed if necessary." The pipes to have "water boxes, valves, or traps for letting off condensed water."

[Printed, 4d. No Drawings.]

A.D. 1861, July 30.—N° 1901.

ALLEN, MATTHEW. — (*Provisional protection refused.*)— This invention consists:—1. In constructing buildings with an external staircase formed in a recess, communicating by balconies at the level of each floor with the several tenements into which it is proposed to divide the building. 2. An improved building material formed of burnt clay, cinders, &c., "and other calcined substances of similar character," that is to say, rough or porous on the surface, mixed with Portland cement and cast in moulds. This material "when used for floors, roofs, lintels, and the like, may be strengthened by the addition of iron placed and arranged edgewise." 3. A kind of pug-mill for mixing the above materials. 4. Casting certain parts of buildings, such as cornices, instead of "running them." (See A.D. 1862, No. 244.)

[Printed, 4d. No Drawings.]

A.D. 1861, August 7.—N° 1962.

LESUEUR, NICOLAS ANTOINE.—This invention is described as "a new system of covering for houses, &c.," and consists in "the formation of dovetail grooves or notches in bricks, tiles, and analogous objects, and dovetailing and wedging them together." Various forms of bricks and roofing tiles are shewn and described, some furnished both with projections and grooves, and intended to be slid on to one another; others having one side plain and the other grooved. The inventor does not confine himself to any material or any numbers, shape, or position of dovetail grooves. These grooves are in some cases filled by sliding the tiles or bricks over each other, in other cases "by tiles and wedges or tenons, by plaster, by wedges, or joggles of wood, iron, or wood covered with hoop iron, or by rods or bars of iron, that is to say, always by tenons corresponding to the mortices, and always in such wise that the filling having once slid into the hollow cannot be withdrawn by a direct lift."

[Printed, 10d. Drawings.]

A.D. 1861, August 14.—N° 2021.

DAMOISEAU, ALCIDALIS AUGUSTE ROMAIN. — (*Provisional protection only.*)—"An improved construction of kiln for baking "or firing bricks, tiles, drain pipes," &c., arranged with the "intention that in order to get better combustion the 'feed air' shall be heated before it reaches the fuel, and that the articles shall be more equally heated or fired" than in other kilns.

The inside of the kiln has "an ellipsoidal shape," is lined with fire-brick, and has "vertical draught furrows." The fuel is burnt in vaults under the kiln, and is supplied with air from the outside through "suitable tubes imbedded in the inside of the "brickwork by which the vaults are separated from each other." In its passage along these tubes the air is warmed before reaching the fuel. Openings in the floor of the kiln admit the heated air, &c. from these vaults; and the "draught furrows" which "communicate at the top of the oven with one or more chimneys," seem intended to aid in carrying off the spent products of combustion.

[Printed, 4d. No Drawings.]

A.D. 1861, August 15.—N° 2034.

KAIN, FRANCIS ALLEN. — (*Provisional protection only.*)—"Vitrified artificial stone or earthenware, applicable for bricks, "tiles, &c." Finely powdered slate is the basis of the composition; to this are added "fine sand, pulverized carbonate of "magnesia, ground silica," and, after thorough mixing, wet clay; the whole is then thoroughly incorporated together, and articles are to be moulded from the material under pressure, dried, and then fired "in a kiln that will stand a vitrifying heat." The heat is to be gradually increased to white heat, and after 72 hours the composition is vitrified. The kiln is to be allowed to cool very slowly. The articles may be glazed by introducing into the kiln along with them "grey or white chalk or limestone," or by the use of "either sugar of lead or any earthy body that will "melt at the before-mentioned vitrifying heat." The proportions, and even materials, may vary "so long as in all cases a large "proportion of slate is retained, and the process of vitrification "takes place."

[Printed, 4d. No Drawings.]

A.D. 1861, September 5.—N^o 2211.

EFFERTZ, PETER.—A machine “for producing perforated, solid, and paving bricks, gutter tiles, roofing tiles, cornice tiles, pantiles, drain tiles, and other similar articles.”

“The machine” is arranged so as to work the clay, force it through a moulding orifice and cut it into lengths, and “consists of two main parts or divisions, first, the press for mixing, cleansing, and shaping the clay; secondly, the self-acting cutting table, on which the band of clay emerging from the mould is cut.” The clay is fed into a hopper placed on the top, and near one end of a hollow cylinder fixed horizontally, and of elliptical section. Along the whole length of this cylinder pass two shafts on which are keyed, at the end near the hopper screws, and near the front spiral knives, “in such a manner that the worm of one is to the right, and that of the other to the left, and the pitch of the knives is smaller than that of the screws.” The clay is thus forced forward against and through a grating, by which it is “cleansed from stones and other objectionable matters” (and which can easily be taken out from time to time). “Screws in front of this grate seize it” and force it along an “elliptical conical mouthpiece,” and through the moulding orifice or die, which it leaves in a continuous stream.

This stream of clay passes over a series of rollers forming the top of the cutting table, and by the motion which it communicates through those rollers to a shaft carrying a projection, which works a lever and clutch designed for the purpose, the clay itself so throws the cutting apparatus alternately in and out of gear with the prime mover as to move the cutter alternately up and down through the clay with proper intervals between the cuts.

The cutter works in guides which can be set “at an angle proportionate with the velocity,” and between each cut the directions of their slope is reversed by the action of an eccentric carried on a shaft below the cutting table, and acting on a “fork-shaped lever.”

[Printed, 2s. Drawings.]

A.D. 1861, September 7.—N^o 2243.

WHITE, ROBERT OWEN.—Improvements in burning bricks. This invention “is applicable when burning bricks in open clamps or kilns, where fuel is mixed with the brick earth, and is

"also interposed in between some of the courses," and consists in so disposing the raw bricks in the clamp that the "necks" or walls built with headers and stretchers and commonly employed in building a clamp, are dispensed with, "and the raw bricks in the several courses, of which a clamp is composed, are all laid in the same direction;" but "in laying the succeeding courses of raw bricks, they should be caused to break joint both longitudinally and transversely with the raw bricks in the course below." The inventor states that upon this plan "the bricks in a clamp will be burned more equally and uniformly throughout a clamp," "and at the same time a far larger proportion of the best burned bricks will be obtained" than from clamps as formerly constructed.

[Printed, *4d.* Woodcuts.]

A.D. 1861, September 13.—N° 2271.

OLIVER, JOSEPH.—(*Provisional protection only.*)—"Improved machinery for making bricks, pipes, and tiles." The raw clay is put into a hopper having a grating for its bottom, and is here beaten by "tilt hammers," till it falls through the grating into a chamber below. From this chamber it is forced by blows from a "horizontal hammer" through a "spout or aperture;" a knife being "fixed in front of the said spout for dividing the clay to the required breadth for the mould." The "pressing machine" receives this clay on a block. "Over the said block slides a mould, in which the bricks are formed under pressure of a punch or die connected to a powerful lever near its fulcrum." The mould, it is stated, "cuts off the required quantity of clay."

[Printed, *4d.* No Drawings.]

A.D. 1861, September 16.—N° 2312.

RANSOME, FREDERIC MAITLAND, and RANSOME, ERNEST LESLIE.—"Improvements in treating stone, bricks, and other surfaces, and in the manufacture of filters."

1. For treating surfaces, the inventors mix up powdered flint, or glass, or other vitrified substance, or fine sand, with soluble silicate, and apply the same to the surfaces; "the soluble silicate is then rendered insoluble," by applying evenly with a brush a solution of chloride of calcium, or "any solution which shall be capable of combining with the soluble silicate of soda or potash."

"so as to form an insoluble silicate." "The pulverised matters will be combined with the silicate (which is rendered insoluble) on the surface," and form a better protection "then when soluble silicate alone is used to impregnate" the material, and "then rendered insoluble therein."

2. In making filters, the material (whatever it may be) is to be formed into hollow bars of triangular section which bars "may be combined at pleasure according to various arrangements," some of which are shewn on the drawing.

[Printed, 6d. Drawing.]

A.D. 1861, September 19.—N^o 2335.

COOMBE, JAMES CANE, and WRIGHT, JAMES.—"Artificial stones, bricks, tiles," &c., and "means for cleansing and indurating" building materials.

This invention consists in "using silicate of potash in combination with hydro-fluo-silicic acid, or hydro-fluoric acid." To a solution of this, "weak or strong as required," is added a solution of the acid "perponderating in its equivalent so as to leave the mixture decidedly acid." To indurate the surface of limestone, the stone is first treated with "hydro-fluo-silicic acid so as to render the lime insoluble as far as the acid penetrates," and then when dry it is treated "to saturation" with the above mixture freshly made. "Sandstones previously acted upon by potash or lime and hydro-fluo-silicic acid, as proposed in the Specification of our patent N^o 626, dated March 14th, 1861, are likewise acted upon in the same manner, using lime or its carbonate in lieu of the silicate of potash" in the mixture.

In the manufacture of bricks, artificial stone, &c. the inventors "propose to mix with the material usually employed equivalents of lime or chalk, or carbonate of lime with hydro-fluo-silicic acid, the acid being slightly in excess, and then to render the whole mass of a proper consistence with the fluo-silicate of potash solution."

[Printed, 4d. No Drawings.]

A.D. 1861, October 26.—N^o 2694.

SMITH, WILLIAM.—"Improvements in the preservation of stone, brick, and other such materials used in building, applicable also to the waterproofing of walls." This is to be per-

“formed by “the use of a mixture of flint and other such silicious substances and alum, or sulphate of alumina, and combining” with these materials, which must be reduced to a fine powder, “a suitable vehicle;” such as “dissolved glue, bituminous substances, or linseed oil and turpentine. The composition thus formed may be applied as a paint to stone, brick, or other material used in building, and will be found a protection against decay or damp.”

[Printed, 4d. No Drawings.]

A.D. 1861, November 2.—N° 2763.

SPENCER, THOMAS, and ROBINSON, THOMAS.—(*Partly a communication from Alfred Delafol.*)—Improvements in moulding machinery, also in the form of pipes. 1. This “invention refers firstly to those machines in which the direct action of steam or other fluid is employed for forcing the plastic material into or through dies, and consists in the employment of an additional power” such as will render it possible to maintain the pressure, and also “work with a less pressure of the fluid.” This is done by weighting “the ram or piston” which compresses the clay either “direct or through the agency of racks, or pinions, or equivalent apparatus,” and the inventors “effect this weighting by using a cistern, which may be charged with water or heavy matter, so that a portion may be drawn off or otherwise removed as required.”

2. When “making articles of earthenware by a plunger, which is forced into a mould,” the second part of this invention “consists, firstly, in covering the said plunger or mould with cloth, leather, or such material, which” is intended to remain on the plastic material when the plunger is withdrawn, and subsequently “may be peeled off;” “and secondly in giving the said plunger or mould a roughened surface.” “This may be effected by using castings rough from the sand” or “by working up their surfaces after the manner of a file or rasp.”

3. The third part relates to an improvement in moulding socket pipes from plastic materials.

4. The fourth part “relates to a particular form of pipe.”

[Printed, 1s. Drawings.]

A.D. 1861, November 15.—N° 2877.

LOOMES, EDWARD.—This invention “relates to that part of “brick or tile making machinery at or by which the clay is forced

" out from the pug mill into or through the moulds or dies." The "improvement consists in adapting to the lower end of the " pug mill shaft one, two, or more eccentrics, cams, or wipers, or " other analogous contrivances in combination with moveable " stops, against which the clay or substance to be moulded is " pressed by the cams or wipers as they move round;" and by this pressure the clay is squeezed or forced out into the moulds.

The "wiper" is fixed at the bottom of the pug mill shaft, and " on the top of the wiper and extending forward from it" is a flat cover which prevents the escape of any clay upwards. The moveable stops when in place extend from the circumference of the clay chamber, or lower part of pug mill to the central shaft; and adjoin the exit openings, of which there are two. When the expression of the clay is completed, and the wiper is about to reach the stop, it is withdrawn by the action of a cam keyed on to the shaft of the pug mill, so that "as one stop is pushed out of the " chamber to allow the wiper to pass the other stop on the opposite " side of the machine will be drawn forward" preparatory to a portion of clay being expressed from the opening on that side.

[Printed, 10d. Drawing.]

A.D. 1861, December 11.—N^o 3104.

PERCY, WILLIAM CARTER STAFFORD.—(*Provisional protection only.*)—Improvements in brick, tile, and pipe machinery.

1. A combination of a table having rotary motion and carrying brick "mould boxes with pistons," with a pug mill fixed horizontally. The mould boxes are filled as they pass under an opening in the pug mill, and the motion of the table afterwards carries them over an inclined plane, which causes their pistons to rise and to eject the bricks.

2. A horizontal pug mill, the discharging opening of which is perforated, and thus acts as a screen. The material passing out is to be carried by an endless apron to be moulded. A pair of rollers will force it horizontally through moulding orifices; but when "mould boxes" are to be employed a third roller is called into action, and the clay passing between it and one of the first-named rollers issues downwards, through a chamber into the moulds. "Doctors" are employed to prevent the clay from passing between these rollers in two directions at once.

3. An improvement in some moulding machines in which, when the filled moulds are moved away from under a plate or other sur-

face, their contents are liable to be partially displaced, whereby the bricks become deformed. This improvement "consists in applying a roller covered with fibrous material so as to pass over the surface of the mould box in the direction in which it moves, and thus replace the material and fill the mould box perfectly."

[Printed, 4d. No Drawings.]

A.D. 1861, December 11.—N° 3108.

TOOTH, WILLIAM HENRY, and YATES, WILLIAM, the younger.—This invention relates to "improvements in the manufacture of iron and steel," to "puddling and reheating furnaces," and also to "the floors of reheating furnaces."

The second part of this invention relates to a certain "ferrous and aluminous composition" "for making the bricks, linings, and other parts of furnaces or apparatus that are exposed to great heat in the manufacture of iron and steel."

These inventors, in carrying out the second part of their invention, propose to employ as a material for fire-bricks "instead of ordinary fire-clay, which is injurious to the quality of the iron," a "mixture in the proportion of twenty-five per cent. of carbon or charcoal, and twenty-five per cent. of iron, cinder, or scale, or oxide of iron, pulverized and intimately mixed or blended and brought into a plastic state by the addition of from 50 to 60 per cent. of good poole or potter's clay, or aluminous earth." This can be moulded into bricks or tiles, or "may be simply used as a coating or lining for the interior of the furnace or cylinder." In another part of the Specification a somewhat different composition is described which is intended to be used as a lining to furnaces.

[Printed, 1s. 4d. Drawings.]

A.D. 1861, December 13.—N° 3141.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from Felix Alexandre Testud de Beauregard.*)—This invention relates to "blowers or apparatuses for superheating steam and other gases, and for projecting them, combined with atmospheric air, upon ignited combustible matter." The inventor states that "this blower is applicable to various industrial uses," among others "the baking of bricks and plaster, and in the burning of lime."

Steam or gas is conveyed into a chamber "where the steam is

"dried," and thence into a "superheating vessel" made of cast iron or fire-clay and "placed in and across a furnace." The "gases and products of combustion" from this part of the apparatus pass through the vessel along vertical tubes, and the steam or gas circulates within it in horizontal ones, and "issues from the "superheating vessel into an outlet pipe, the nozzle of which "enters" the wide end of a funnel-shaped tube, from which it issues into the furnace or other fire within which combustion is to be stimulated. Atmospheric air enters the funnel, and is drawn along the pipe and thrown upon the fuel along with the superheated steam or gas. There is a pyrometer of fusible metal in the superheater. "A pipe furnished with a cock is carried from the "superheating vessel and enters another, the outlet from which is "under the bars; thus a blower is provided to the apparatus "itself."

[Printed, 8d. Drawing.]

1862.

A.D. 1862, January 17.—No 126.

MOSS, BARROW.—(*Provisional protection only.*)—"This invention consists in the use of the material known as steatite or "soapstone or silicate of magnesia, as found in its natural state, "when applied to the manufacture of fire-bricks, fire-blocks," and other similar purposes.

"The Inventor by preference reduces the steatite to powder, "then moistens it with water, to which in some cases it is preferred to add a weak solution of potash or other chemicals." The material so prepared is to be moulded under pressure, and the articles fired. For some purposes "clay or other substances "may be combined with the steatite."

[Printed, 4d. No Drawings.]

A.D. 1862, January 28.—No 220.

CHURCH, ARTHUR HERBERT.—"Improvements in the means "of preserving stone, brick," and other building materials, "also "in the application of colours." This inventor claims "the exclusive use" for these purposes and after the manner described

in his Specification, "of a solution of silica in water when preceded or followed by a solution of baryta or strontia in water," and "of the mixture of a solution of silicate of potash or soda with sulphuric, hydrochloric, or other common and suitable acid (and which mixture may be regarded as an impure solution of silica) preceded or followed by a solution of baryta or strontia, as applied to any" of the above purposes. The mode of preparing a solution of baryta or strontia, and the mode of preparing the "solution of silica otherwise called silicic acid," which last it is preferred should be "by the process known as dialysis," as also the mode of preparing the "acid mixture" or "impure solution of silica in water" are all described, but are not claimed, nor is the separate use of the solutions claimed. The inventor prefers to employ the solution of baryta or strontia hot, and either of the solutions containing silica as soon as possible after they have been prepared. The strength of the solutions is to be regulated according to the qualities of the material to be operated upon, which qualities also determine which solution shall be first employed, and whether either or both solutions shall be more than once applied.

Colours may be mixed with the hot solution of baryta or strontia before being applied, and fixed when nearly dry by a solution of silica in water being applied to the surfaces painted with them. By this invention "no corrosive acids and unnecessary or hurtful soluble salts are introduced into the stone, but two substances only, silica and an earthy base, which by their union within and upon the surface of the stone or other material form an insoluble protective silicate."

[Printed, 4d. No Drawings.]

A.D. 1862, January 28.—N^o 228.

BODMER, RUDOLPH, and WILSON, WILLIAM.—1. An improvement in manufacturing artificial stone or bricks according to Owens' patent N^o 1270, May 28, 1856, which improvement consists in mixing with the materials "sal amoniac or other salts of ammonia."

2. Artificial stones or bricks made "entirely of hydraulic or other limes, or of a combination of different varieties of lime," and intended "to resist the influence of water and heat."

3. Making "artificial stones or bricks of a black or dark colour," from pulverized pit coal, or coke, either or both, incor-

porated with lime or calcareous cement and moulded. Charcoal alone, or mixed with the coal or coke, is also used for the same purpose.

4. The "use of sal ammoniac or other salts of ammonia in the manufacture of artificial stones or bricks made entirely," or partly, of lime or calcareous cement.

The third head of this invention is also applicable to artificial fuel.

[Printed, 4d. No Drawings.]

A.D. 1862, January 30.—N° 244.

ALLEN, MATTHEW.—This invention consists of, first, a mode of so arranging the staircases of buildings as "to render them fireproof by dividing or insulating the staircases from the building with a view also to economise space.

2. A new material for building purposes, to be formed "by the combustion of cinders, slags, coke, culum, clinkers, or other calcined substances of similar character thereto, possessing an irregular, uneven, or porous surface, with Portland or other cement in the proportion of about one" of cement to three of other substances, the whole to be tempered with sufficient water, and moulded "for the making of walls, floors, roofs, stairs, slabs, lintels, chimney pieces, or any other parts of buildings." The articles formed "are to be strengthened when necessary, by placing iron bars or ribs therein edgeways."

3. "Casting or moulding the said combined materials, in moulds, faced with zinc or other suitable metal," to prevent the materials adhering to the mould while setting. (See A.D. 1861, No. 1901.)

[Printed, 4d. No Drawings.]

A.D. 1862, February 1.—N° 269.

SMITH, WILLIAM.—Improvements in machinery for moulding and also for compressing bricks, tiles, &c.

In this machinery the material, first passing between two rollers or fed in from a pug-mill or "in any convenient manner," enters an opening in the periphery of a cylindrical casing, inside of which works a revolving cylinder. This cylinder has one or more blocks, or bars, on its circumference which carry the material before them to the moulds; these open into the cylinder, and lest the blocks should carry the material past them a projection, moveable but held in place by a powerful spring, is so placed

within the casing as to direct the material into the moulds and prevent any passing till the moulds are full; when this has taken place the pressure of the spring is overpowered, and the projection within the casing is forced back, allowing the surplus material, if any, to pass, as well as the blocks on the cylinder. There is also an "escape valve" or safety valve in the casing. The mould or moulds are fixed in a sliding table actuated by a cam on a revolving shaft; they are surrounded by a chamber to which steam or hot water is admitted, and steam is also admitted to the interior of the revolving cylinder, "for the purpose of drying" or partially drying the material to be moulded."

The moulds are open at top and bottom, and while filling are closed below by a fixed plate; when full the motion of the sliding table moves them out, so that, while other moulds are being filled, their contents may be removed, either at once or after compression. To simply remove the bricks, "pressing plates" are caused to descend upon the moulds by the action of a combination of levers worked by a cam, and their contents are thus forced out and taken away; but those moulds the contents of which are to be compressed before removal are carried by the sliding table between two dies, which are caused to enter the mould at the same time from above and below, and after advancing to a regulated distance so as to compress the brick between them, both to withdraw: a tray carried by a weighted lever is now brought under the mould, the upper die again descends, and forces the brick downwards on to the tray, and this latter being now heavier than the maintaining weight causes the lever to move on its fulcrum, carrying the brick with it, after which the tray is withdrawn from under the mould. The compressing dies are carried by the rods of two pistons working in steam cylinders, and the valves and stops for changing the action of the steam so as to advance or withdraw them are actuated by a combination of cams and levers, shown on the drawings and described in detail in the Specification.

[Printed, 1s. Drawings.]

A.D. 1862, March 22.—No 807.

HENRY, MICHAEL.—(*A communication from le Société Coignet Père et Fils et Compagnie.*)—Improvements in "kilns, furnaces, and ovens" or apparatus suitable for burning bricks and performing various "other operations in which materials or articles are to be sub-

"jected to fire or to heat." 1. An arrangement of kiln having: "a sole or floor, directly or nearly directly under which furnaces or fire-places are placed, and through which sole or floor numerous openings are formed for the passage of flames and products of combustion from the fires into the kiln or oven." These inlets occupy the sides of the floor, and a series of similar openings, by preference not in a line with the inlet openings, should occupy the middle of it, which openings communicate with a flue and serve as outlets. Spacious outlets, which ordinarily are kept closed, are also provided in the side walls and vaults, and when it is wished to cool the kiln these are opened so that a current of cool air passes through it.

2. An arrangement in which matters to be heated are placed in a receiver within a vault or chamber, and "rested on an arch extending over the fire," and so protected from the direct action of the flames. Flues convey the products of combustion "into (and to the top of)" the vault or chamber, and other flues, "opened and closed by valves, registers, or dampers," convey them away. The furnace and ash-pit are closed by air-tight doors furnished with stop-cocks or valves, by means of which the supply of air to the furnace, and consequently the heat of the chambers over it, can be regulated.

3. An arrangement in which the furnace has two perforated arches over it forming an arched space from which the products of combustion are conducted by a flue or flues to the kiln or "main chamber." The furnace is supplied with air by a blower, which can also throw air into the arched space over it, so that heat can be increased by forcing more air into the furnace, lowered by forcing air into this upper space. The flame and gases are led into the upper part of a "main chamber" containing the articles to be burnt, and carried off by an outlet flue from the bottom of the same, thus passing through its contents. The outlet at the bottom has a damper, by the use of which the gases in the chamber may be maintained "under a pressure slightly exceeding the external pressure." The flue from this outlet leads upwards to a hopper "at the top of and separated by a sliding door from the main chamber, and containing materials which are about to be subjected to the fire, and the flame and gases," in their passage, warm or "heat the charge or supply of material temporarily placed therein." A modification of this arrangement is shewn in which there are two "main chambers," which

can be charged alternately, and which communicate by flues fitted with dampers, so that the heat enters the top of whichever chamber is charged, and passes from the bottom of it into the adjoining chamber and thence into the chimney.

[Printed, 1s. 6d. Drawings.]

A.D. 1862, April 4.—N° 960.

WOODHOUSE, ANDREW, and HUNTER, THOMAS.—(*Provisional protection only*)—Improvements in the arrangement of kilns and flues for the burning, and stoves for the drying of bricks, tiles, &c., &c. The object of this invention being to utilize the waste heat from kilns in heating articles occupying adjoining kilns, and afterwards in drying other articles placed in drying stoves. Three or more kilns are to be built side by side, the top of each covered by an inner perforated arch and an outer unperforated arch. The products of combustion arising in any kiln of the series rise into the space between its two arches, and from thence are carried through a series of flues fitted with dampers, into any or all of the other kilns, "where the bricks or other articles" are required to be dried preparatory to firing," and thence into drying stoves. "Small fires are made in the stoves used" for drying, by which the combustible portion of the gases is "burned." The residue finally escapes through a chimney.

[Printed, 4d. No Drawings.]

A.D. 1862, April 5.—N° 976.

FACONNET, LEOPOLD.—"A new kind of tiles" for roofing forms the subject of this invention. A portion of the upper surface of each tile is raised above the rest, and these raised portions, which may vary in shape, alone are visible when the tiles are laid on a roof, and they are so shaped as to fit close together and to present a continuous plane surface showing no overlapping. The tiles might be solid, but usually the raised part is hollow behind, strengthened with ribs, and furnished with a catch or catches for holding on to the roof, and a small rib "which isolates the tile" from the lath," to keep it dry. On the covered part of the face of each tile two water channels are formed, arranged so as to lead into those of adjoining tiles, in order to carry off any water that may penetrate the joints. The ribs and channels are described minutely by the inventor.

A "stop tile," of a semi-cylindrical form, and a special tile for the eaves, are provided. The "stop tiles may vary in form to suit the rest of the roofing." "An arrangement of ridge tiles, fitting on the roof without plaster, completes this roofing."

[Printed, 1s. Drawings.]

A.D. 1862, April 7.—N^o 989.

CARRINGTON, JAMES.—(*Provisional protection only*).—Bricks for paving stables and stable yards. This inventor says:—"I propose to make my bricks with rounded top and edges, which when brought together and cemented in their places will produce a grooved surface, which will give the horse a good foothold; and the edges being rounded, the animal will not be liable to injure his haunches when lying down." Both top and bottom of the bricks are to be rounded, and they should be arranged diagonally, "the grooves," that is to say, the channel joints between brick and brick, "all in the same direction," so as to be "easily kept clean by means of a broom."

[Printed, 4d. No Drawings.]

A.D. 1862, April 8.—N^o 990.

STEVEN, WILLIAM.—(*Provisional protection only*).—"Improvements in machinery for moulding bricks," &c. The moulds of this machinery are placed in a slide which moves to and fro across the bottom of an ordinary pug mill. While one portion of the moulds are being filled, the contents of others, previously filled, are being consolidated by pistons pressing from below. The compression completed, the pistons are withdrawn, the slide moves further, and the bricks are discharged out of the moulds downwards by other pistons brought down upon them from above.

The slide may be moved by means of a connecting rod from a crank in the central shaft of the pug mill, continued downwards for this purpose. The compressing pistons are mounted on a slide caused to follow the mould slide in parts of its journey, and are "elevated or depressed by means of levers on a shaft or on studs beneath, the movement being caused simply by the horizontal motion of the slide turning the levers over through a limited angle." Similar arrangements actuate the discharging pistons.

The sliding block, matrices, and other parts are to be maintained at an elevated temperature, by the introduction of steam into casings round them, or by other means, in order to prevent the adhesion of the clay; "and this has at the same time the advantage of hastening the drying of the bricks."

[Printed, 4d. No Drawings.]

A.D. 1862, April 8.—N° 1005.

COBLEY, THOMAS, and WRIGHT, JAMES.—This invention refers, first, to improvements in "treating auriferous and argentiferous" ores for the purpose of extracting from them their gold and silver.

2. The utilization of the residue, of which part is adapted to use in the manufacture of glass and porcelain, and part, "consisting chiefly of more coarsely divided silica or quartz," the inventors, in their Provisional Specification, had proposed "to mix with a sufficient quantity of chloride of magnesium," or a "thoroughly saturated solution of the same (for example, the bittern of the baysalt works,) so as to form it into a plastic mass, out of which bricks, slabs, blocks, and stones are moulded," which are to be afterwards fired. This portion of the invention is not, however, included in the Final Specification.

[Printed, 4d. No Drawings.]

A.D. 1862, April 17.—N° 1121.

TOLHAUSEN, FREDERICK.—(*A communication from Victor Duprat.*)—(*Provisional protection only.*)—A machine for moulding bricks, tiles, and similar articles. The moulds are fixed near the circumference of "a strong metallic disc turning on a central pivot, and supported in its rotary motion by casters or spherical balls like in a railway turntable." The motion of the disc brings "the moulds successively under the action of one or several shaping or pressing plates."

One or more "fly wheels set tangentially in a vertical position" actuate the disc, and "by means of cams also act on plates for lifting the brick or other article out of the mould."

[Printed, 4d. No Drawings.]

A.D. 1862, May 3.—N° 1322.

SCHLICKEYSEN, CHARLES.—This invention relates to certain improvements in detail, directed towards "increasing the efficiency of the process of drying bricks."

B. & T.

"ciency and reducing the power required to work brick, tile, pipe, and turf moulding machinery." A vertical pug mill with a hopper at top and one or more openings at bottom for moulds forms the ground work of the machine. The central shaft carries screw pugging blades, each of which, except the top one, has so much of its extent as lies below the next higher blade horizontal, in order that the clay may be compressed while being pugged. There is a false bottom to the pug mill, with which several flanges are combined, and which serves to keep the clay out of the lower bearings of the shaft.

The moulds or dies may be double so as to form two tiers of bricks if desired; they are to be of wood, channeled and covered with moleskin, and water is to trickle through the channels; the openings to these channels may be covered with cloth; the moulds may taper; their angles are to be rounded internally through a part of their length; and threads to lead up water by capillary attraction are to be introduced behind the moleskin in these angles. Sometimes the moulds are lined with metal plates "which will admit of moisture exuding between their joints;" turf moulds are to be of wood "the grain of which runs transversely to the line of progress of the plastic material, but the corner fillings will lie parallel with the moving mass."

A cutting table with rollers receives the moulded clay, and upon this it is cut by vertical wires. If the moulds are double the table also must have two beds one above the other; and "to separate the cut portions and facilitate their removal," the diameter of some of the rollers is increased, and thereby "superior speed" given "to the moulded articles at a portion of their traverse along the cutting table."

[Printed, 10d. Drawings.]

A.D. 1862, May 31.—N° 1652.

SULLIVAN, WILLIAM KIRBY.—(*Provisional protection only.*)—This invention relates to the preservation of building materials, to artificial stone, and to fixing colours. Its "chief object is to impregnate stone, cement, or plaster, with chemical substances that will render the same impervious to, or capable of resisting the effects of damp." To effect this a soluble fluo-silicate, as that of magnesia or of zinc, is first applied; this is then decomposed "by the application of a solution of an aluminate of potash or soda, or silicate of potash or soda, or both successively, or by

"a silicate of alumina dissolved in an alkaline solution." For cements the ingredients are mixed "with the aluminate of potash" and then with the silicate of potash," or else are mixed with the "solution of the silicate of alumina directly," and while moist the fluo-silicate is added.

For "colours in marbles, plaster, or moulded clay," use is to be made of "fluo-silicates of certain metals either alone or in conjunction with fluo-silicates of zinc or magnesia, by the decomposition of which the colours are produced." "A mixture of "fluo-silicates" is employed in giving these "colours to tiles or bricks, or earthenware, which may be afterwards vitrified." Any colours used for frescoes may be mixed with the fluo-silicate of lime or magnesia and subsequently fixed by silicate of potash alone, or by a solution of silicate of alumina, or by successive coatings of silicate or aluminate of potash."

[Printed, 4d. No Drawings.]

A.D. 1862, June 19.—N^o 1813.

THOMSON, WILLIAM.—(*Provisional protection only.*)—Brick and tile machinery. In this machine two streams of clay are caused to issue from opposite sides of a pug mill, and each is forced between a pair of pressing rollers through dies, and cut off into lengths. The two pairs of rollers are connected together and one driving shaft actuates the whole, gearing with the pug-mill shaft by a bevelled toothed wheel and pinion, and driving the rollers by chain wheels carrying endless chains. "Dies, of a rectangular section both at their entrance and at their delivery end," but with curved surfaces connecting the two ends, are preferred.

For filling a pug mill with clay a truck is contrived which can be drawn up an incline and when at its top will tip over, and will at the same moment bring the drawing-up machinery to rest; there is a catch to prevent the truck tipping too soon, and a stop to prevent its running back before it has been restored to its proper position on its carriage.

[Printed, 4d. No Drawings.]

A.D. 1862, June 21.—N^o 1835.

GONNON, HENRY.—(*Provisional protection only.*)—Brick-making machinery. On a main driving shaft are fixed two cams, of which one actuates a lever, causing "a hammer to strike the

" clay when it has fallen into the mould, and form it into a brick :
 " the other cam serves to produce a movement which lifts the
 " brick out of the mould." A kneading apparatus to prepare
 the clay, a knife to cut it to the right size for the mould, and a
 spring to aid in removing the completed brick form part of the
 invention. " By adding to or abstracting from the blades of the
 " kneader or malaxer, the bricks may be made of any thickness
 " without change of mould, and the moulds may be changed at
 " will to suit the dimension of brick."

[Printed, 4d. No Drawings.]

A.D. 1862, June 24.—N° 1851.

CARR, THOMAS.—A machine or mill for grinding and tempering various sorts of materials including crude clay. In this machine the material to be acted upon is placed in a revolving horizontal pan, and is acted upon by edge runners resembling grinding stones fixed vertically. The inventor does not claim the revolving pan, but he claims,—

1. " Driving the edge runners independent of the revolving
 " pan, either in opposite directions to it, or at a greater or less
 " speed," yet so mounting them that they may give way if any
 substance too hard to be crushed gets into the pan.

2. " Carrying the edge runners independently of the pan " so
 that their edge may not bear on it, and the distance between runner
 and pan may be accurately adjusted to any gauge required.

3. " Regulating the exact amount of pressure the edge runners
 " shall exert, by weights or springs.

4. " Furrowing or grooving in some cases the edges or periph-
 " eries of the edge runners, or the bottom of the revolving pan,
 " or both," or inserting knives or teeth.

5. " The general arrangement and combination of the various
 " parts." Several varieties of the machine differing in dimen-
 sions, modes of gearing, and other details, and adapted to different
 purposes, are shown on the drawings, and described in the Spec-
 ification, which see.

[Printed, 3s. 6d. Drawings.]

A.D. 1862, July 23.—N° 2099.

BELL, ROBERT.—(*A communication from Joseph Mamelin.*)—
Improvements in the form of bricks, intended to enable them to

be so thoroughly bonded together as to produce "a mass incapable of being riven or cracked," forms the subject of this invention.

"The bricks are to be formed with projections or tongues across or along one surface and with grooves or recesses of a corresponding size on the opposite side," and are to be so laid with mortar or cement that the projections and hollows of adjoining courses of bricks shall fit into one another. These bricks may be made wedge-shaped for arches, tunnels, or vaults; and the inventor states that with them arches can be built without the use of centres.

[Printed, 8d. Drawing.]

A.D. 1862, July 29.—N° 2148.

HUGHES, EDWARD THOMAS.—(*A communication from Emil Langen.*)—This invention relates to the treatment and utilization as well for mortar as for bricks, &c. of the slag of furnaces, and consists of,—

1. An "improved system of changing the slag flowing in a glowing condition out of blast, puddling, and other furnaces, by a rapid and complete covering with water or any other steam developing fluid." This can be done by receiving it as it leaves the furnace in one or more reservoirs of water.

2. "The application of the slag" thus "prepared, for the manufacture of mortar, and also with admixture of lime or other cements, for manufacturing bricks, stones, slabs, and other articles."

[Printed 4d. No Drawings.]

A.D. 1862, September 4.—N° 2447.

PLATT, JOHN, and RICHARDSON, WILLIAM.—This invention has reference to the burning of bricks, tiles, &c., and "consists in a method of heating a filled kiln in a preparatory manner," by causing the heat from one kiln "in which the burning of the bricks or other articles has been effected" to be, for this purpose, "transferred to another by means of a blast of air which passes from the top of the heated kiln to the lower part of the other." This may be done by connecting the fire holes of the two kilns by means of a tube made air tight, and then blowing a strong current of air into one of the ordinary flues

apertures of the hot kiln; this air passes through the tube into the cold kiln, "carrying with it the heat retained by the burnt bricks or other articles, and thus a preparatory heating of the said kiln is effected."

[Printed, 8d. Drawing.]

A.D. 1862, September 4.—N^o 2450.

PLATT, JOHN, and RICHARDSON, WILLIAM.—This "invention relates to processes whereby crude or untempered clay is brought into a condition suitable for being compressed in moulds." In order partially to dry the clay, screen it, and sift out the pebbles, it is cast into a hopper beneath which are two screws having a species of ridge fixed between them. These screws are caused to revolve at unequal speeds and in opposite directions, and they act upon the clay so as to break it up and slowly drive it forward into a long cylinder fixed at a slight inclination and lined with shelves running parallel to its axis. A rotary motion is given to this cylinder, and the clay is conveyed along it, and in its course is repeatedly lifted towards the upper part of the cylinder and allowed to fall, and while it is being thus agitated and separated a current of heated air blown along the cylinder dessiccates it to any desired extent. The material is next sifted, which it is preferred should be done through a screen, and it is then passed between rollers to crush any small stones that may have passed the screen.

In the second part of this invention the clay, prepared as above, is allowed to fall into the space between two horizontal discs connected together by several series of vertical rods, and caused to rotate rapidly within a suitable casing. The centrifugal force produced forces the clay outwards between the various series of rods, and so completes its disintegration. To keep the inner surface of the case clear there is a scraper, and "the use of a revolving casing in connection with a stationary or moving cleansing instrument or scraper, or a revolving scraper acting upon a stationary casing" is claimed. "The application and use of the different sets of apparatus in combination" is also claimed. A method of separating the material into different finenesses by allowing it to fall in a stream, and directing a current of air upon it while falling, forms part of the Provisional Specification, but is omitted from the Final one.

[Printed, 1s. 4d. Drawings.]

A.D. 1862, September 19.—N^o 2577.

MAW, GEORGE.—“Improvements in the manufacture of tesserae and other mosaic inlays.” These improvements consist partly in producing tesserae and other forms employed in mosaic work of “glass, enamel, or other vitreous material, by casting or moulding such forms upon a principle in which the finished article is discharged from a different part of the die or mould to that by which the molten material is admitted.” For this purpose a series of moulds, slightly taper in shape, are formed within the thickness of a metal plate, the wider ends of the moulds being downwards. A moveable “face or bottom plate is placed underneath this mould plate,” and “molten glass or vitreous metal is filled into the mould from its upper surface;” as soon as the contents of the moulds have set the superfluous metal is removed from the back, and “the face plate is removed, when the moulded articles will be discharged face downwards.” The “moulding plate” need not necessarily be in one piece. In order “to mould square or undercut forms it must be in several parts.” Tesserae may also be made from the same materials by stamping them when the material is “molten or semi-molten” by “employing for this purpose a perforated plate pierced with perforations of the form of the article to be moulded, such perforations” being close together “and the divisions between each brought to a fine edge.”

Also “gilding or silvering tesserae and other inlays” made of ceramic bodies by the application of gold or silver leaf to their surfaces under a vitreous glaze.”

[Printed, 4d. No Drawings.]

A.D. 1862, October 6.—N^o 2696.

HOLLAND, SAMUEL.—“Arranging or combining and working the parts of” brick and tile machinery “essentially in the manner described and illustrated” in the Specification and drawings, “whereby a column of clay or other plastic material is forced through dies by means of hydraulic pressure.” The machine as illustrated consists of a hydraulic ram, consisting of a metal disc working in a vertical metal cylinder, having bolted to the central stem of the ram, and below it, a forcing or clay piston connected to it by a rod. Water can be pumped into the space above the ram by force pumps worked by manual or other power. A

moveable clay chamber charged and carrying at the bottom of it the die through which the material is to be expressed is run in under the piston on a tramway; the force pumps are then worked and the ram descends and expresses the clay. When the ram has descended low enough it passes an orifice in the cylinder, which permits the water to escape and brings the machine to rest. A rack and pinion for raising the ram, and a cock for the escape of the air above it during that process, are provided. The machine may be made horizontal, and if so can be double-acting. It may be used for expressing drain-tiles, &c., or for consolidating in dies previously moulded articles. "The precise details may be varied without departing from the nature of the invention."

[Printed, 10d. Drawing.]

A.D. 1862, October 27.—N° 2893.

LINDEMANN, GUSTAV. — This "invention relates, firstly, to a "method of bringing the clay or other plastic material into a "condition for being moulded." The materials are fed from a hopper in between two rollers of which one is a hollow cylinder and has its periphery full of slits. The motion of the rollers forces the material through these slits into the interior of the roller or cylinder, where it is received behind a fixed curved plate or guide, which serves to retain it till it reaches the side of the cylinder opposite that through which it was forced in, and then forces it to pass again out of the cylinder through the slits into moulds or a suitable receptacle. The bearings of the plain roller are moveable, and it is held in place by a system of weights and levers so as to give way if a stone too large to pass into the hollow cylinder be presented, and to allow it to drop between the roller and the cylinder. The inventor does not limit himself to the use of a cylinder of the construction shewn, or even to a cylindrical surface at all for screening his materials.

2. "When articles are formed by being forced through moulds "and then cut off I cause them to abut against a surface" of boards, "retained by levers, which when the material has been "severed turn downward and deposit the moulded article on to "a travelling apron or other such apparatus."

3. Constructing the sides of "hoppers for delivering plastic "materials to rollers or other apparatus which are to operate "upon it, of "travelling surfaces," that is to say, of endless webs passed over rollers to which motion is communicated.

[Printed, 10d. Drawings.]

A.D. 1862, October 27.—N° 2896.

HOWIE, JOHN.—(*Provisional protection only.*)—"Improvements
" in machinery or apparatus for regulating the supply of solid or
" liquid bodies to mills or other apparatus used in mixing or pre-
" paring plastic matters." The solid matter is to be conveyed
at an uniform rate from the receptacle for it to the pug mill
through a cylinder by a screw revolving in the cylinder and
impelling the material forward.

The supply of water passes through a chamber which is alternately filled and emptied by the motion of the machine. A moveable end acted on by a screw provides a means of altering the capacity of this chamber, and thus "the supply of water may
" be regulated with great ease and certainty, so as to obtain the
" plastic compound in the required state of consistency."

[Printed, 4d. No Drawings.]

A.D. 1862, October 28.—N° 2898.

HOOVER, EDWARD.—Improvements in the form of roofing tiles. The first of the improvements which form the subject of this invention consists in forming in the tiles sunken channels upon "their upper surfaces, free from any rebate, shoulder, or
" raised portion that would prevent the tiles from lying close
" together" on a roof. Of these channels the higher portion is covered over by the adjoining tile, and the lower portion is uncovered. Each tile has on its under surface grooves which, when the tiles are fixed in place, "fit exactly over the before-mentioned channels in the tiles beneath," thus forming drips over the
" same."

2. Giving to tiles so channeled such a form, that "the meeting
" corners of two contiguous tiles are cut off so as to form meeting
" edges, in which notches are made for intercepting the passage of
" the water."

3. Regulating the amount of lap to be given to the tiles by the amount cut off at the angles as above referred to. The external edges of the tiles are to form straight lines when fixed, and the intention is that the lap shall be so small as to allow the roof covering to be very light; and that the arrangement of channels open and covered shall be such as perfectly to carry off all water.

The inventor prefers to prepare his tiles for fixing diagonally, the fastening being at one angle, but he also shews on his illustrations tiles prepared according to his invention for fixing the square way on the roof. He shews and describes minutely the shapes and positions of the channels and grooves on both shapes of tile, but does not limit himself "to the precise configurations of " tiles " so shewn, or to any special material, or size, or mode of fixing.

[Printed, 1s. Drawing.]

A.D. 1862, November 3.—N^o 2973.

BROOMAN, RICHARD ARCHIBALD (*a communication from Jean Baptiste Defrasne.*)—"This invention consists in constructing " and arranging moulding and pressing machinery." In this machinery two pistons are connected to the same half of an oscillating beam, one attached near the fulcrum, the other at the end of the beam. "One piston," the one nearest the fulcrum, "is used " to compress and mould the substances in moulds carried on a " revolving platform, and the other for driving the moulded and " compressed substances out from the moulds " onto an endless web beneath. The revolving platform has its outer edge toothed; motion is communicated to it "through a paul and lever worked " from the same prime mover" as the beam; and as it revolves it is made to present the articles first to the moulding piston and then to the ejecting one.

Where the moulds are of such a shape that the moulded articles cannot be forced through them downwards, a piston rising from below is employed, to force them out upwards as the moulds successively become placed above it. "This latter piston is made to " move up and down by levers connected to the main beam."

[Printed, 8d. Drawing.]

A.D. 1862, November 12.—N^o 3050.

THOMSON, JAMES HILL.—(*Provisional protection only.*)—"Machinery or apparatus for finishing and dressing tiles and " similar articles of clay." An endless chain having rectangular metal slabs bolted on to a certain proportion of its links is caused to travel through the machine. The articles to be finished are placed by hand on these slabs, and to each slab is fixed a rim or stop to keep the article from being displaced by the action of the

tool. The articles are carried by the chain under an adjustable "dressing tool" somewhat similar in its action to a plane-iron, so that "as the endless chain moves forward the plastic material is cut to a uniform thickness, and at the same time dressed and finished by the action of the dressing tool."

[Printed, 4d. No Drawings.]

A.D. 1862, November 20.—N° 3116.

STEVENS, CHARLES.—(*A communication from Alois Milch.*)—"An improved brick-making machine" is the subject of this invention; it is constructed entirely of wrought and cast iron, and is stated by the inventor to be simple and little liable to derangement. In this machinery the clay, as dug, and after "little or no previous preparation," is brought by an endless band to the "top of the machine, where it passes between two" or more "mixing and dividing cylinders into a receiver which supplies the moulds as they pass underneath;" the speed of the endless band is "regulated according to the quantity of clay required." An endless chain, passing over two horizontal "chain wheels," carries the brick moulds; these are of wrought iron, each separate, and with a moveable bottom to which is affixed a piston. These moulds become filled as they pass under the receiver, which is carefully fitted to them, and then under a pressing cylinder which consolidates their contents, and under a blade which cuts off the surplus. The further progress of the chain, round one of the chain wheels, brings the moulds, now mouth downwards, under an inclined plane which gradually forces down the pistons of the moulds, and so causes the bricks to drop out onto boards which are carried under the machine by a second endless chain, fresh ones being brought and the filled ones removed by hand. If necessary, further pressure is given, before ejecting the brick, by causing the mould to pass over a turntable, and at the same time forcing down the piston by means of a wheel.

[Printed, 10d. Drawing.]

A.D. 1862, November 21.—N° 3126.

HADFIELD, CHARLES, and ATTKINS, WILLIAM ALFRED.—Machinery for "compressing bricks, tiles, clay, peat, and other materials." A revolving table carried by a central stem or

pillar contains the moulds; they are all open at top and "each fitted with rising bottom-dies and pistons;" these pistons travel along a circular inclined plane below the table, so that the rotation of the table raises the pistons and causes them first to compress the lower part of the brick, and after the main piston is withdrawn to expel it. There is a "rising and falling" "main piston" attached to an arm hinged upon the same central stem as carries the mould-table, so that the piston travels along with the table so long as it is in the mould. This main piston is actuated by a crank, which causes it to descend from above, and enter each mould in succession and compress the contents, the "bottom die" being at the same time caused to begin to rise. The sides of the moulds are made hollow to receive hot water, hot air, or steam. This arrangement may be modified, as, for example, by fixing the table vertically. Another part of the invention consists of "a loose panel" intended to form "the indent" "or recess in the brick," and placed on the face either of the under pistons or of the upper one, having between it and the piston a spring or india-rubber packing "to relieve the pressure on the" "machine, and keep the articles compressed of a uniform size."

"The stroke of the main piston can be varied by employing a "disc crank and adjusting crank pin;" that of the mould pistons by using "an adjusting circular inclined plane."

[Printed, 8d. Drawing.]

A.D. 1862, November 21.—N° 3136.

TAYLOR, JOHN, junr.—"Improvements in the manufacture of tiles or moulded blocks for building purposes;" also in paving and roofing tiles. For building purposes, L-shaped or "angular" "tiles or lumps, each having two outer surfaces at right angles to" "each other," are formed by forcing or expressing clay through such a die as will mould several "together in one block, and so" "connected to each other that they may be dried and burned, and" "transported to any distance before they are separated for use;" and further, the "moulding orifice is such that some of the bent" "tiles (which are all of the same section and dimensions) are" "within, whilst others form the outside of the block." These tiles may be employed for the facing of concrete walls, one limb of the tile being built into the wall in the manner shewn on one of the drawings. Extra wide bonding tiles are to be used with the

others in such work, and a special die to form two of them together is shewn on the drawings.

The tiles for floors are each to have at one edge "an under or "projecting rib" as a bearer; this projects beyond the upper portion, so that it "not only acts as the bearer of the tile of "which it forms a part, but it also forms the bearer of one edge "of the next tile," leaving a hollow air space under: the ribs too are partly cut away to permit free circulation of air. Tiles for the edges of the paving are to have their ribs flush with the edge of the upper surface. These tiles may be moulded in blocks, two in each block.

The inventor improves the roofing tiles for which he obtained Letters Patent, 27th February 1861, N^o 506, by forming on the upper surface of each, and at the upper part, "curved inclined "projections," intended when the tiles are laid on a roof to exclude snow and "to guide the moisture from the sides to the "middle of the tiles." He also fixes these tiles by forming notches "at the outer edge of each tile, in which the wedge- "formed heads of nails are received."

[Printed, 10d. Drawing.]

A.D. 1862, November 25.—N^o 3164.

RANSON, GEORGE.—This invention is applicable to the sifting and screening of clay for making bricks "by the dry process" and "for the manufacture of some kinds of pottery and tiles." The inventor suspends an ordinary rectangular sieve from a beam by straps, so that one end shall be slightly higher than the other. He fixes lengthways to the bottom of it "several slack thin chains "of one-eighth inch iron" sufficiently longer than the sieve to shake about among the clay when the whole is set in motion, but not slack enough to touch each other. A vertical shaft hanging over the centre of the sieve and having at its lower end a crank to which the sieve is connected, receives rotary motion and communicates a circular motion to the sieve, causing the fine clay to fall through it. The inventor finds it advantageous to use "a "combination of two or more of these improved sieves placed one "under the other in the same frame, so as to form a compound "sieve, and moved or agitated by one crank as above described." He prefers perforated zinc to wirework for the bottom of the sieves, but either may be used. The parts separately are not

claimed, but the invention consists in the above combination of them and mode of agitating them for the purpose of sifting clay.

[Printed, *8d.* Drawing.]

A.D. 1862, November 25.—N° 3166.

LONGLEY, WILLIAM.—An improved arrangement of machinery for moulding bricks. Four open moulds with plungers to close them at bottom are, in this machine, arranged on the periphery of a cylinder fixed with its axis horizontal, and to which an intermittent motion of a quarter of a revolution at a time is given. The mould which is at starting the machine uppermost is under a hopper, from which clay is forced into it by a screw; and when it moves away "a knife edge situate at the bottom of the hopper "scrapes the lips of the mould clear of clay." The first move of the cylinder brings the mouth of this mould horizontal, and while it is in that position a horizontal "compressing plunger" is caused to enter it and to consolidate the brick, and then is withdrawn; at the same time the next mould is being filled. The second move of the cylinder causes the mould to point downwards. While in this position, a lever acts upon the plunger at the back of the mould, depresses it, and ejects the brick on to an endless web, which carries it away. The walls of the moulds and the compressing plungers are hollow, and steam is admitted to heat these surfaces.

The motion of the cylinder is effected by a catch at the end of a bent "rocking lever," which receive from a crank a to-and-fro motion; a wheel with four teeth is keyed on to the cylinder, and at each oscillation of the lever the catch advances till it seizes one of these teeth, and draws it back with it far enough to give a quarter revolution to the cylinder. A bolt or "locking bar" is caused to steady the cylinder between each movement. The forward motion of the "compressing plunger" is given by an eccentric cam fixed on a revolving shaft and bearing against the end of the plunger, "a weighted crank lever" operating to draw it back. A second "rocking lever" is employed to act upon the plungers of the moulds in order to eject the bricks.

[Printed, *1s. 2d.* Drawings.]

A.D. 1862, December 2.—N° 3230.

BLUMBERG, GEORGE FREDERICK.—The manufacture of "ornamental glass, tiles or quarries," for lining surfaces and for

paving, forms the subject of this invention. These tiles are cast in metal moulds, smooth inside, and heated before they are used; the molten material is poured into them, "being very particular in the quantity;" and then a plunger carrying an ornamental device in relief is caused to descend on the mould and impress the tile with the pattern. "If the tiles, quarries, or slabs, be of large size a casting table may be used, and the cavities for the designs made by a roller prepared for that purpose." For small tiles "an ordinary pan mould" is used, "with an upper mould or lid hinged thereto (or they may be used separate); on this latter is formed the projection of the size of the intended design, and on this projection (or on a separate piece screwed on or otherwise attached thereto) is in metal the design itself." After being pressed as above described the tile is cooled and annealed, and the design is now painted; or a corresponding design "already painted on paper or other material," is placed on the embossed part, and secured there, "filling up the cavity with plaster of Paris or other suitable material." For paving tiles the surface of the "pan-mould" is indented so as to "roughen the face of the glass, and serve to give foothold." The face of the plunger or upper mould is "cut into rays, lines, or other forms which on pressure it reproduces on the face of the glass around the design." The inventor reserves the right to modify details, to use coloured or parti-coloured glass, and "to make grooves, lugs, or other protuberances in or on the metal" of the tiles to aid in fitting or fixing the same together.

[Printed, 4d. No Drawings.]

A.D. 1862, December 4.—N^o 3255.

CASTELBON, HENRY.—(*A communication from Jean Joseph Felix.*)—(*Provisional protection only.*)—A brick and tile press. This invention appears, so far as the description given in the Provisional Specification explains its nature, to have comprised an upper mould with a "come and go" motion, and a series of "lower moulds" carried by a wheel to which "intermittent quarterly turns" are given. "The clay is cut and brought forward by a moveable apron" to the point where it enters the moulds, and after each cake of clay is deposited the upper mould is caused to compress and shape it. While the upper mould is

rising, suitable gearing gives "motion to the shaft carrying the wheel which is to bring another bed beneath the upper mould." "This machine itself prepares the clay by means of crushing cylinders or a malaxing barrel."

[Printed 4*l*. No Drawings.]

A.D. 1862, December 6.—N° 3272.

CRAIG, JAMES, and CRAIG, MATTHEW.—Improvements in apparatus for the preparation of clay for manufacture into bricks, pipes, &c., and for cutting clay pipes into lengths. These improvements relate primarily to the regulating the supply of clay and of water to a pug mill. 1. "The clay after passing through the ordinary grinder" may be "elevated into a hopper;" out of this it passes "into a revolving cylindrical riddle," and thence it is raised to a second hopper by an "elevator." "A small horizontal feeding cylinder" conducts the clay from this second hopper to the pug mill." "The amount of feed of the clay is regulated by the action of a revolving screw inside the horizontal feeding cylinder," the rate of revolution of which screw can be regulated at pleasure. "The feed hopper is fitted with an overflow duct which carries back for re-elevation any surplus clay supplied beyond what the screw carries forward." 2. The pug mill may also be fed "by means of an elevator, the speed of which can be varied, and which takes up the clay from a hopper or box filled to excess by another elevator substantially as herein-before described." 3. The third part of this invention relates to "the supplying of water to a pug mill for manufacturing clay by a pump worked through the intervention of an adjustable lever for varying the stroke, and consequent rate of supply." A crank on a shaft connected to the pug mill shaft gives, through a connecting rod, a to-and-fro motion to one end of a lever having a fixed fulcrum at the other end, and having the connecting rod which conveys motion to the pump jointed to it by a sliding connection at an intermediate point. This connection can be readily moved so as to be more or less distant from the fulcrum by a screw, and thus a greater or less length of stroke can be given to the pump.

4. The fourth part relates to "the cutting of clay pipes from a pug mill by means of a cutting frame working in a guide frame,

" which latter moves along with the pipe whilst the cut is being taken," as described and shewn fully in the Specification and drawings.

[Printed, 1s. Drawings.]

A.D. 1862, December 9.—N° 3303.

EFFERTZ, PETER.—"Improvements in machinery or apparatus for making bricks, tiles, drain pipes," &c. This invention is an "improvement on a patent granted to" the same inventor A.D. 1861, September 5, N° 2211, and consists in—1. "First. The employment of three or more rollers at short distances from each other, and running in contrary directions at different speeds, for the purpose of mixing the clay or plastic material and forcing it through a channel and one or more dies or shapers." The rollers have their axes horizontal; when three are used, the first and second are fixed side by side and the clay is fed in between them from a hopper. The third roller is under the second, and the clay leaves the machine after passing between the second and third rollers. A greater space is left between the first and second than between the second and third, and the surface of the first moves slower, that of the third faster than the second. This is effected either by making the rollers of the same size and driving at different speeds, or making them of different sizes and driving them at an uniform speed, "or by both means combined."

2. The second part is "the employment of scrapers or doctors for clearing the adhering clay from the rollers." These are so fixed as to clear the rollers, and side plates connected to these doctors and fitting perfectly close to the ends of the rollers convert the space between said rollers into a "channel for the clay, fitted" with a die or shaper, "or more than one," through which channel the clay or "material is forced in the desired shape," so as to quit the mould as "a band or continuous length of clay;" this is received on "a rolling or cutting table, on which the clay is cut transversely the desired lengths for forming the bricks, tiles, or other articles."

[Printed, 1s. 10d. Drawings.]

A.D. 1862, December 11.—N° 3320.

BRECKON, JOHN ROBERT, and DOUGLAS, THOMAS.—This invention consists in manufacturing fire-bricks and other

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"refractory articles of the fire-stove called ganister, as it is found in the counties of Durham and Northumberland, combined with the (ordinary) fire-clays as they are obtained from the coal measures of the two aforesaid counties." The inventors find the proportions of from four to five of ganister mixed with one part of ground fire-clay to afford excellent results, but do not confine themselves to that proportion.

[Printed, 4d. No Drawings.]

1863.

A.D. 1863, January 5.—N^o 37.

BESSEMER, HENRY.—Improvements in hydraulic presses, some forms of which "will be found suitable for moulding or compressing and consolidating dry materials, as in the making of bricks, tiles, tesserae, and other articles;" other forms being intended for use in the manufacture of metals. Those portions of the inventor's claim which come within the above limits are, 1, "transmitting to the rams of hydraulic presses a self-acting and continuous reciprocating motion through a limited and regulated distance." 2. Accumulating force in a heavy fly wheel during the time when the ram is being removed from and being brought towards its work, and "transmitting" the same to the ram "during a portion or near the end of each stroke or pulsation." 3. A mode of "regulating the distance apart of the cutting or pressing surfaces or dies" in such presses, and 9 "the continuous working of hydraulic presses by means of a plunger or force pump not furnished with valves and communicating direct with such presses."

The press consists of a "stout cast-iron upright cylinder with a close bottom. An arch springing from opposite sides of the same casting "carries a fixed and upper die;" a cast-iron ram moving in the cylinder carries the lower and moveable one. The ram is "rendered water-tight in the usual way by an expanding leather ring." Motion from a steam engine or other motor is given to "a force pump plunger by means of a crank, on the shaft of which a heavy fly wheel is a fixed; the pump barrel, if it may be so called, is not provided with any valves but continues as a simple pipe of uniform diameter, or nearly so,

"until it communicates with the cylinder of the press beneath the plunger." Thus the plunger will rise and fall with each stroke of the pump and the fly wheel serves to store up power during that portion of each stroke when no work is being done.

To regulate the length of stroke the means are supplied of admitting more water, from a sufficient head, to the ram, or allowing water to escape. The action of the press can be entirely stopped, without stopping that of the motor, by allowing sufficient water to run off. A loaded safety valve should also be provided in combination with the pump, in order "in case the object placed on the apparatus is too large or too hard to admit of the motion of the pressing surfaces, that such valve may open and relieve the apparatus from undue strain."

[Printed, 3s. 4d. Drawings.]

A.D. 1863, January 6.—N^o 49.

DAHLKE, JULIUS GUSTAV.—(*A communication from Gottfried Sachsenberg.*)—This invention is stated to consist in "the construction and employment of certain machinery for cutting clay in the manufacture of bricks, tiles, and similar articles." This machinery is intended to receive a continuous stream of clay issuing from a moulding orifice and to cut it into rectangular blocks, such as bricks; its main feature is a frame or "carriage" mounted on "wheels for travelling on rails," and carrying rollers covered by an endless web; this carriage is moved to and fro, alternately meeting and receding from the head of the stream of moulded clay. Upon this carriage and at that side of it which is furthest from the moulding orifice is mounted a "frame capable of transverse motion." The main frame or carriage being moved up towards the stream of clay that stream passes along it till the transverse frame is full, i.e., till enough for a fixed number (say 3) bricks has passed on to it; this block of clay is then severed from the stream by a cutter arranged for the purpose. The carriage is now moved a little away, "and the transverse frame is pulled out laterally, whereby the clay is brought into contact with say three cutting wires or blades, and the three portions of clay so cut, say bricks, are removed ready for being stacked and the carriage returned to its original position." The transverse frame is itself fitted with rollers to receive the clay, but "in order that the cut off piece of clay may rest securely upon

" the frame and not upon the rollers " a self-acting motion lowers these rollers every time the frame cuts the clay and raises them again after the clay has been cut. To provide for the chance of the carriage being pushed back too far or from some other cause of more clay coming on to the transverse frame than it will hold, the side of it or " door " against which the clay abuts is made moveable so as to give way. It appears to be intended that this machine shall be worked by hand.

[Printed, 1s. 10d. Drawings.]

A.D. 1863, January 10.—N° 89.

LEPREUX, LOUIS HENRY EMMANUEL.—(*A communication from François Jaffaray.*)—(*Provisional protection only.*)—Slabs for coating the internal faces of walls intended " to preserve apartments from the effects of damp " forms the subject of this invention. The slabs " are composed of resin, plaster, sand, and " gravel or flint." In fixing them a " tie piece is placed at each " joint which is closed with some of the same composition as that " of the slabs." " Plinths and foundations for walls may be made " of the same composition.

[Printed, 4d. No Drawings.]

A.D. 1863, February 21.—N° 471.

MALPAS, CHARLES.—" Improvements in ovens or kilns for " firing burning or baking pottery, bricks, tiles, &c."

These include 1. " The construction and employment of " annular ovens or kilns with revolving beds for " the above purposes " having one or more external furnaces, and diametrically " opposite these, or at some distance from the same, one or more " openings for filling in and removing the goods to be fired, and " in which ovens or kilns the draught from the furnace or furnaces passes directly underneath the objects to be fired, and " thence vertically up among the same into one or more flues " formed over or near the roof of the oven or kiln ; also in combination with the above, the arrangement of flues lining a " a certain portion of the walls of the oven or kiln for gradually " raising the temperature of the articles to be fired." 2. " A " chamber serving as a mustering, drying, and placing room " formed on the top of annular ovens or kilns with rotating beds " so as to utilize the spare heat therefrom." 3. The arrangement

of such kilns shewn on the drawings. The rotary motion of the bed is given to it by hand power from a winch in the centre of the drying chambers above the kiln, which imparts motion through gearing and shafts to pinions which gear into a continuous circular rack fixed below the annular bed. The motion is intended to be very slow, and goods are to be continuously fed in on to the bed, burnt during their journey round, and then removed when they reach the door again, without stopping the firing or the movement of the bed.

[Printed, 2s. Drawings.]

A.D. 1863, February 24.—N° 506.

CHATTERTON, DAVID BANNISTER.—(*Provisional protection only.*)—"Improved brick-making machinery." Open moulds with moveable bottoms are "arranged on a circular or approximately circular frame." The frame being moved round, clay is forced into the moulds one by one by the action of "a screw placed in a hopper or feeding tube," each next comes under a press to mould the brick, and afterwards passes over an eccentric which expels the brick by raising the loose bottom of the mould, after which "the eccentric acts on a roller and forces the loose bottom back to its place."

The bricks are removed on an endless apron. The gearing by which the different motions are communicated appears to be considered as forming part of the invention.

[Printed, 4d. No Drawings.]

A.D. 1863, March 9.—N° 647.

COWLEY, JAMES.—"Machinery or apparatus for manufacturing moulded bricks, brick mouldings, perforated bricks, tiles, and drain pipes." The clay used in this machine "may be taken direct from the bank," and being placed in a hopper passes through a pug-mill having two shafts side by side; from this it is fed into a "receiving box," from whence it is forced into the mould by a piston or plunger, which works horizontally to and fro. The top and bottom sides of the mould are moveable; and if the brick is to be perforated or recessed "cores, of greater or less length to produce the perforations or indentations intended" are introduced through openings left for the purpose in the side facing that where the clay enters into the interior of the mould.

"so that the clay is forced round them as it enters the mould." When the mould is filled, the main plunger already referred to retires, the top and bottom plates of the mould (and the cores or prongs also, if they have been used,) are withdrawn; an "expelling piston," acting vertically, now enters the mould from above and forces the brick out downwards on to an endless cloth which removes it. With this "expelling piston" are combined means of lubricating the interior of the mould, and a second piston, working within the "receiving box," which "forces down" the clay into the bottom of the receiving box in readiness to be "pushed forward into the mould box at the next stroke of the "main plunger." An arrangement for scattering sand or ashes on to the clay in the pug mill is provided.

"When making brick mouldings a die is placed on one of the "angles of the mould." In making tiles or pipes the mould is replaced by a moulding orifice with a cutting frame in front of it. The mechanical gearing, &c. by which the different parts of the machine are actuated, are fully shewn on the drawings, and described in the Specification, but are not claimed as forming part of the invention.

[Printed, 10d. Drawing.]

A.D. 1863, March 26.—No. 789.

COWDERY, GEORGE.—Improvements in machinery for the manufacture of bricks, which machinery formed the subject of Letters Patent granted to the same inventor 16 Feb. 1860, No. 425. In this improved machine a large number of open moulds with moveable bottoms are arranged round the periphery of a vertical cylinder. These moulds receive clay from a hopper "having triangular revolving shafts, and rollers placed therein" or other suitable contrivance for pressing the clay or loam into "the moulds." The triangular shafts, the section of which is peculiar, are shown on the drawings. The moulds when filled revolve on their own axes, meeting a cylindrical roller, which is supplied with "projections which are moveable on the roller so that a flat pressure is obtained." The clay in each mould thus becomes thoroughly compressed and receives the usual indent on one side. The further movement of the moulds brings them under "stampers," which eject the bricks from the moulds on to an endless band.

[Printed, 8d. Drawing.]

A.D. 1863, March 26.—N° 796.

JOHNSON, JOHN HENRY. — (*A communication from Louis Hébert.*) — (*Provisional protection only.*) — Improving the combustion of fuel by throwing jets of steam and air into the furnace, or “above and beyond the furnace in the smoke stack or flue,” and “applicable to the furnaces of brick, pottery, and other kilns.” The introduction of this jet into a furnace is managed by making a tube pass through the ash-pit door with its opening directed towards the under side of the furnace bars. Within this tube is a steam pipe, and there are perforations in the tubes. “On turning on the steam jets in the tube a vacuum will be formed therein, and the atmospheric air will be drawn in and impelled forward by the steam jets (with which it mingles) with a velocity in accordance with the pressure of the steam.”

[Printed, 4d. No Drawings.]

A.D. 1863, April 11.—N° 915.

VERSMANN, FREDERICK. — (*Provisional protection only.*) — “A machine for moulding clay, raw or prepared peat, and other materials of a plastic nature.”

The material is forced through dies or moulding orifices “by a screw revolving in the interior of a hollow cylinder with an intermittent action,” or by “any other arrangement producing the same effect.” During the pauses in the action of the expressing machinery a “frame with knives and cutters is moved across the mouth of the dies, and the moulded material is cut into blocks of certain lengths,” which are carried away on endless bands, to which intermittent motion is also given coinciding with that of the expressing machinery.

Without confining himself thereto the inventor describes and claims a mode of obtaining his intermittent action. Rotary motion is given to a shaft to which “are attached two spur wheels, each having the teeth only about one-half round its circumference.” These gear with two ordinary spur wheels, one setting in motion the expelling and the other the cutting machinery, and they are so fixed as to act alternately. “In order to insure the true action of the semi-gear wheels” a pair of “false teeth” are placed on the rim of each “at the half pitch,” and each of the four above-named spur wheels also carries a disc, those on the two ordinary wheels having “two segmental notches

" on each, into which a portion of the periphery of the other two
 " discs (those on the semi-toothed or semi-gear wheels) turns,"
 and these retain alternately the wheels " of the expelling and
 " the cutting machinery until each has performed its assigned
 " functions."

[Printed, 4d. No Drawings.]

A.D. 1863, April 23.—N° 1011.

CLARK, WILLIAM.—(*A communication from Pierre François Boulet.*)

This invention relates to improved roofing tiles, and machinery for their manufacture. The tiles are light, "their edges also are
 " rounded so as to present less resistance of the wind;" on their
 under-sides are formed projections or "keys for fixing the tile
 " to the laths of the roofing;" and they "lap at the edges to
 " prevent water getting in," each tile having a hollow at one
 edge and a corresponding projection at the other. The tiles are
 however shown on the drawings as having other projections not
 described in the specification.

The machinery for the manufacture of these tiles consists of
 1st, "cylinders having circular grooves and gearing one with the
 " other for cutting up and crushing the material." 2, "A
 " pressing box," into which the prepared clay is allowed to fall
 from the cylinders above referred to; a piston moves to and fro
 in this box, actuated by an eccentric, and forces out the clay
 through an opening at the end of the box, "so as to form a
 " sheet of clay." 3 "A cast iron mould for receiving the sheet
 " of clay in order to form the tiles. This mould is placed in a
 " press acting vertically, in which the sheet of clay receives an
 " energetic pressure which reduces it to one-third of its thick-
 " ness, and so causes it to take the exact form of the cast iron
 " mould."

[Printed, 8d. Drawing.]

A.D. 1863, April 29.—N° 1086.

HENRY, MICHAEL.—(*A communication from François Coignet.*)—

The first part of this invention "relates to improved machinery
 " for manufacturing Coignet's patent béton," for which he
 " obtained British letters patent, respectively numbered 2659
 " and 2757, and dated 26th November, 1855, and 6th December,
 " 1859." This machinery is stated to be applicable to other pur-

poses, among them to pugging clay ; it consists of a pug mill, fixed vertically, with means of feeding it at the top "by an elevator," and furnished with the usual blades on its shaft and within its casing, as well as special blades at the foot of the shaft for expelling the materials. The improvements claimed are; 1 and 2, making an almost continous discharging opening, or a series of discharging openings all round the base of the mill, "so that the materials "after being mixed will be discharged in a continuous sheet from "every or nearly every point in the circumference" of its base. There is an adjustable "annular valve" to regulate these openings. 3. Making the chamber of the pug mill in three pieces, one to form the bottom, with the openings above referred to, and the remaining two to form the walls of it, "whereof one is removable." 4. Means of mounting this machinery on a carriage to which wheels can be fitted for transport, and fitting it with A shaped legs for it to stand on when stationary, which legs can be unfastened and screwed on in an inverted position when it is placed on the carriage. 5. "The arrangement and combination of parts "constituting the improved machine," embodying the above features, as shewn on the drawings and described.

The second part of this invention "relates to the production of "artificial stone and of artistic and ornamental surfaces articles and works in Coignet's patent béton or composition."

[Printed, 10d. Drawing.]

A.D. 1863, May 1.—N° 1096.

JONES, EDWARD.—(*Provisional protection only.*)—The first part of this invention relates to improvements in machinery for the manufacture of bricks, blocks, and drain pipes, which formed the subject of Letters Patent granted to this inventor, dated 26th July 1858, No. 1683. These improvements consist in additional spiral knives to the pug mill; receiving the clay into "feed boxes," from which it is forced out by pistons; cutting it into blocks, and conveying these blocks or bricks along "an endless chain of pallet "boards" to moulds which are lowered on to the bricks, and within which they are consolidated by the action of pistons covered with felt. The blocks or bricks can be perforated while in the moulds, and after being moulded they are expelled and are conveyed on barrows to be piled on planks in the drying ground. These planks are furnished with frames covered with canvas for the protection of the bricks from weather while drying.

In moulding drain pipes "feed boxes with spiral screws in them" receive the clay from the mill, and force it out in continuous streams through moulding dies. See also the Specification of the same inventor, 31st October 1863, No. 2708.

[Printed, *4d.* No Drawings.]

A.D. 1863, May 19.—N° 1255.

KELLY, JOHN.—(*Provisional protection only.*)—Improvements in the treatment of peat and the manufacture from it of, among other articles, building and other tiles and blocks. The bog being cleared of its spongy surface a portion of peat is severed from the remainder, and perforated and propped up to promote its drying; it may then be cut into various shapes, or "freed from woody fibre and reduced to a plastic pulp," and then removed and "piled or arched on high level dry ground in upright oblong clamp-like bodies to a considerable height." Here the peat is to consolidate and dry, and when required for use can be "moulded by an ordinary tile machine into pipes for draining or into blocks for flooring and building purposes."

[Printed, *4d.* No Drawings.]

A.D. 1863, May 21.—N° 1276.

THOMALLEY, ABRAHAM.—(*Provisional protection only.*)—Constructing brick kilns "with a number of flues which convey the smoke and sulphurous vapours to a tall chimney built at any convenient distance." "In some cases two or more kilns may be combined with one chimney."

[Printed, *4d.* No Drawings.]

A.D. 1863, June 2.—N° 1375.

COTTAM, GEORGE HALLEN.—"Bricks suitable for being used for paving stables and other places," form the subject of this invention, and the improvement in them is to make them oblong, as usual, but "square in transverse section," in place of being "deeper than they are wide." They can also be made perfect cubes; and in using bricks of these shapes any one of the sides may be placed uppermost.

"All the edges of the bricks are also bevilled," so that there will always be a V-shaped channel between the upper surfaces of

adjoining bricks;” “they can also be made without the bevilled edges, so as to form a plain surface.”

[Printed, 8d. Drawing.]

A.D. 1863, June 3.—N° 1389.

BARFF, FREDERICK SETTLE.—This “invention has for its object the employment of an improved means of protecting, preserving, and hardening surfaces of bricks, cement, stone, stucco, and other analogous substances.” This object is to be effected by “the use of the mixture of sulphate of baryta and carbonate of lime with a soluble silicate of soda or potash.” The inventor states the proportions in which he uses the materials, and that they are to be mixed with water, and the solution of silicate, “by preference the silicate of potash,” to “the consistency of an ordinary paint,” and laid on, like paint, with a brush. “To produce the maximum of hardness and durability the material so laid on should afterwards be further saturated with the silicate of potash.” Colouring matter may be added if required.

[Printed, 4d. No Drawings.]

A.D. 1863, June 5.—N° 1398.

GUILLAUME, SAMUEL ST. BARBE.—(*Provisional protection only.*)—“Improvements in bricks, brickwork, and brickmaking.”

The bricks are proposed to be solid or perforated, and of three different lengths according as they are used, “stretchers, bonders, and headers;” also half-headers and half-stretchers are to be made.

The improvements in brickwork consist in introducing metal bond, building walls hollow, ornamenting the ends of perforated bricks with tiles, slate, stone, &c., and building ornamental patterns of brickwork.

Moulds for making several bricks at a time to have only one side and a bottom to each. “They would be so packed that the back of one would form the front of the other, and kept firmly in that position;” the ends of the moulds being supplied by a frame, clay is filled in, and the top of the whole series levelled at once. Perforations can be made if desired by means of a series of tubes to be forced into the clay, the frame being apparently intended to be lowered to make way for them.

[Printed, 4d. No Drawings.]

A.D. 1863, June 15.—N° 1492.

FORRESTER, JOHN.—“ Glazing any or every description of
“ bricks, quarries, slabs, tiles, earthenware pipes, and other
“ earthenware or ceramic articles, of whatever shape, form, or
“ application, and whether plain or coloured, or ornamented, by
“ first coating such articles, when in an unfired state, either
“ wholly or partially with any suitable glaze material, and then
“ firing, baking, or burning them, so as to produce a glazed sur-
“ face upon them, and fire, bake, or burn them at one and the
“ same operation.”

In firing, the inventor either leaves the articles exposed to the flame, or encloses them “ in saggars, or by means of other cover-
“ ings of well-known form,” or fires them in ovens constructed with an “ inner casing of fire-bricks or quarries,” according to the nature of the articles.”

[Printed, 4d. No Drawings.]

A.D. 1863, June 18.—N° 1529.

IVETT, EPHRAIM.—(*Provisional protection only.*)—“ Improve-
“ ments in the manufacture of tiles cut to an ornamental shape.”
The material is to be forced out from dies in sheets of the proper thickness and breadth, and is “ received on to a travelling bed,” where it is kept in its proper course as it moves by guide rollers. “ Cutters, the edges of which take the shape of the ornamental
“ edge desired to be imparted to the tile,” are mounted below this bed, and rise from time to time and pass through the clay, and thus form the edge. The cutters are kept lubricated with oil or water, and cross bars are fixed immediately above them, “ which
“ prevent the clay from rising with the knives, and ensure thereby
“ a clean cut.” The clay is lastly cut into single tiles by wires.

[Printed, 4d. No Drawings.]

A.D. 1863, June 20.—N° 1550.

PETERSON, CHARLES.—“ The manufacture of ” a “ new
“ material or compound, and its application to various useful
“ purposes,” such as slabs and blocks for roofing and paving,
pipes for various purposes, sheathing for ships’ bottoms, carriage panels, and as a substitute for papier maché.

In manufacturing the material any "vegetable fibre or substance suitable for the purpose" is to be boiled in caustic alkali for 12 hours, and then reduced to pulp.

Tar, pitch, or "other bituminous substance, mineral or vegetable," is also to be boiled with about $\frac{1}{4}$ lb. weight of caustic alkali till saponified, and then while hot mixed with an equal weight of the pulped fibre.

After the addition of about 10 per cent. of alum, sulphuric acid, or "other suitable powerful chemical decomposing agent," the resulting material is to be formed by any convenient method into the articles required; but "pressure in combination with heat" must be employed.

If a portion of "flour or other farinaceous matter" be introduced, the proportions of other ingredients being at the same time modified as described in the Specification, the material will have a smooth surface, and take a polish, being rendered "less harsh and more plastic, and it is then suitable for fine work, such as picture-frames, cornices, &c."

[Printed, 4d. No Drawings.]

A.D. 1863, July 2.—N^o 1646.

BROOMAN, RICHARD ARCHIBALD. (*A communication from Camille Baroness de Lavenant.*)—Composition "for coating slate, bricks, pottery," &c., and protecting metals from rust, forms the subject of this invention.

A colourless composition containing crystal or glass, minium, subcarbonate of potass, and borax, "serves as the base of all the others." This base is combined with various substances, named in the Specification, to give the colours blue, red, green, yellow, jet black, silver grey, brilliant dark colour, white, bronze, and olive. The ingredients are to be broken up, mixed, and fused over the fire, and after cooling, pulverized and applied to the surface of the article, either rinsed with water by a brush, or by sifting or by dipping. "The articles are next baked in a muffle or stove hermetically sealed." The minium may be dispensed with in the colourless base, and it may be made of glass, potass, borax, and carbonate of soda, or of glass, tartar, nitre, and borax. The proportions of the various materials are stated in the Specification, but are not claimed.

[Printed, 4d. No Drawings.]

A.D. 1863, July 8.—N° 1692.

HASELTINE, GEORGE.—(*A communication from Isaac Gregg.*)

—This invention consists of improvements in that “description of brick machines in which the clay is pressed into moulds in a reciprocating frame by means of a pressure roller acting in combination with cutters in a hopper, and the bricks expelled by “lifters, which being operated by the reciprocating motion of “the mould frame, force the pistons of the moulds upward.” These improvements consist in—

1. “Parallel Λ grooves along in the under side of the reciprocating mold frame,” bearing upon wheels “correspondingly beveled” at the edge, “for the purpose of preventing the access or retention of any falling sand or grit.”

2. Forcing down the pistons to the bottom of the moulds before the latter receive their charge of clay, by means of flanges on the stems of the said pistons, and “retaining plates” clipping these flanges, and caused so to move, as the table traverses, as “to cause a full and perfect descent of all the pistons to the “bottoms of the molds.” To effect this an “additional hook” is added to “the usual piston elevating hook,” the action of which is shewn on the drawing.

3. So placing the moulds in the table “that their narrower sides “shall form their mouths for receiving the clay,” and the expelling pistons act “against the lower side edges only of the backs.” This is done “for the purpose of economising the motive power,” and of also, “producing better finished bricks.”

4. A “sweep or mould chain” to push aside the bricks when raised to the surface of the mould table, which “sweep” is a “bottomless box” having a roller or cylindrical brush working in it, and kept supplied with oil, so that at each movement of the “sweep” across the moulds, and their pistons, these latter are well lubricated.

5. Working this “sweep” by means of a cam wheel, with either a “vibrating lever,” “as shown on the drawings,” or an “adequate rock shaft” to connect “the said” “sweep and cam wheel together.”

5. The special mechanical contrivances shewn on the drawings and described for so regulating the motion of the traversing mould frame that it shall pause during the time that the “sweep” is passing over it.” Motion is communicated to this frame (through

adjustable bars and a lever) from a crank on the shaft of the same cam wheel which operates the "sweep," but the pin which connects this crank with the bar travels during part of each revolution from one end to the other of a slot in the latter, and during this time no motion is transmitted to the frame.

[Printed, 8d. Drawing.]

A.D. 1863, July 14.—N° 1766.

SLATER, JAMES. — "Improved machinery for compressing bricks, tiles, and other plastic materials" forms the subject of this invention, which consists] "of an arrangement of levers in combination with pressing surfaces in the construction of machinery used for the above-named purpose; and appears to include dispensing with the use of cams, eccentrics, wheels, and pinions," and also "rendering such machines double-acting." In the arrangement described and illustrated by the drawings a horizontal main shaft is mounted on bearings at the bottom of the machine, and a rocking motion is communicated to it by a long lever worked apparently by hand, a weight being so fixed on a separate short arm as to give additional momentum. At each end of this shaft is fixed a cross arm, and two pairs of rods rise from the corresponding ends of these arms, and each pair is connected to one of "two separate horizontal pressing plates, which are alternately brought over a hollow mould," a double mould; one part for each pressing plate, "fixed to and across the upper part of the framing of the machine." The motion of the plates is so guided that as they rise they are moved sideways clear of their moulds, so as to permit the removal of the consolidated article and the placing of a new one in position. An additional arm at the centre of the shaft is caused to work two pistons lying at the bottoms of the two brick moulds; these pistons rise after the compression is completed, and eject the consolidated brick. During the compression, however, each piston rests "on the top of the frame," so as to offer solid resistance to the pressing plate.

[Printed, 10d. Drawing.]

A.D. 1863, August 1.—N° 1908.

BIBBY, RICHARD EDWIN.—"A plaster, cement, or composition having great fire-resisting properties" forms the subject of this

invention. "The composition may be made and employed to
" cover walls, ceilings, roofs, and floors of buildings, either as a
" plaster or stucco in a plastic state, or made into bricks, quarries,
" or tiles, or for lining furnaces, kilns, retorts, ovens, or for the
" manufacture of crucibles," &c. The ingredients made use of are
" steatite (French chalk), sulphate of lime, lapis ollaris, and
" silica, to which are added solutions of sulphite of alumina, or
" alum, gum tragacanth, tungstate of soda, and glue."

The proportions vary according to the uses to be made of the composition; and it is stated that when sulphate of lime is used it is to be calcined; that the materials are to be rendered "free from all combined iron by well known means," and that they are to be reduced to powder and mixed with sufficient water to make the mixture fit for plastering with, or if for bricks, &c., for being "moulded and burnt."

[Printed, 4d. No Drawings.]

A.D. 1863, September 2.—N° 2166.

LEWIS, JOSEPH.—Improvements in machinery for drying clay and in machinery for making bricks and tiles. These improvements comprise :—

1. An apparatus for drying and granulating the clay in which a series of rotating discs carrying "cutters" are arranged one above another, each within a dish heated by steam. The clay falls from dish to dish, and in its progress is dropped on to each disc in succession, and being thrown outwards by centrifugal force is disintegrated by the cutters on the discs, and is dried by the heat of the dishes. Another contrivance for the same object provides a hot chamber along which the clay is moved by the action of "spades or scoops." Two other contrivances shown have a wavy or scalloped hot surface over which clay is similarly moved; and another is shown "in which the clay falls by its gravity down a succession of inclined steam chambers, being lifted and retarded in its course by" "certain rotating buckets."

2. A moulding machine, where the moulds are arranged in a circular table having intermittent rotary motion. The pressure is given by the piston of a steam cylinder placed below the mould table, and acting upwards, a strong crosshead being provided to resist the compressing force. The steam piston acting upon a

lever causes the pistons belonging to two moulds to rise at the same time, one to a greater extent than the other, so that by each stroke of the steam piston one brick is consolidated and another ejected.

3. The general construction of the moulds, which have a lining of "an antifriction metal or alloy cast or fitted therein, or zinc or copper deposited by galvanic action," and are furnished each with a mould piston, and also with an arrangement for lifting the brick, when ejected, clear of the mould "ready for removal."

4. Limiting the length of stroke of the piston in the steam cylinder above referred to by introducing a nut adjustable from outside into the upper part of the cylinder. The object of this is to vary the thickness of brick or tile produced.

5. Modifications in the machinery for which Letters Patent were granted to this inventor A.D. 1857, No. 2484, viz., "to cast the three cylinders" of that machine "in one piece," "and also to cast or otherwise secure the cam wheel moving the mould table in one piece with the table." Further to "cause the pistons fitting the moulds to be drawn down into position to receive the clay by means of a cam whilst the table is stationary."

6. Modifications of the above, some of which are partly shewn and described, admitting the use of water or air in place of steam to actuate the machine.

[Printed, 2s. Drawings.]

A.D. 1863, September 3.—N^o 2176.

BOULTON, WILLIAM, and WORTHINGTON, JOSEPH.—This "invention is designed principally for the purpose of making "and inlaying encaustic tiles from pulverized clay," but "may be employed with slight modifications for the manufacture of "other articles from plastic substances."

A block, the size of the bottom of the intended tile, and which may be called the fixed "ram or bottom die," is fixed to the press, a "box or mould" to form the sides of the tile is fitted to it, "and capable of sliding up and down thereon." This mould having been slid down, a plate perforated "in the form of the "central part of the desired pattern," and of a thickness corresponding to that of the desired inlay," is laid on the "bottom

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"die" and kept in place by guides. The perforated pattern is now "filled in with pulverized clay of the desired colour," and a second or "pressing plate" furnished with projections of the same size as the perforated pattern is placed over the first and lightly pressed to consolidate the clay. "The two plates are then removed leaving the central ornament on the surface of the ram or bottom die." A second plate is then used so perforated as to leave clear all that has been already formed together with further portions of the pattern, which "space is then filled in as before with pulverized clay of the second colour, and pressed with a corresponding pressing plate." When the whole of the coloured portions have been thus formed the box or mould is raised to a sufficient height and "filled in with pulverized clay of the required ground colour," and the final consolidating pressure is then given by the moveable ram of the press.

[Printed, 8d. Drawing.]

A.D. 1863, September 18.—N^o 2296.

NOIROT, ALFRED.—(*Provisional protection only.*)—This "invention consists in using in the manufacture of tiles the raw materials now employed in the manufacture of delph, stone-ware, and porcelain articles, also in the shape of the tiles shewn on the sheets of drawing." The tiles shewn are roofing tiles, jointed at the edges, and having one of them a lozenge in its centre, the other a more elaborate arrangement of ribs on both faces. Part of the face of the tile near the edge is inclined to throw the water away from the joint.

[Printed, 8d. Drawing.]

A.D. 1863, September 19.—N^o 2318.

FARMER, JAMES, and HADFIELD, CHARLES.—This invention includes two separate improvements in machinery "for making bricks, tiles, or slabs."

1. "An improved pug-mill," within the "cylindrical or other chamber" of which "is a revolving shaft carried at one end by external bearings, but not supported at the other end which is that from which the material is forced." Along the sides of the shaft are "blades working between spikes projecting from the chamber;" at its end "are vanes arranged spirally thereon"

and intended to expel the clay, "either through moulds or in a mass suitable for being moulded by an after process."

2. The second improvement "relates to apparatus for cutting the stream of moulded material transversely."

The cutting wire is strained between two bars, and caused to pass alternately up and down with an intermittent motion through the stream of clay. Two slots which guide the wire are formed in levers set sloping and reversed between each motion of the wire, so "that at each cut the acting angle of the wire is altered so as to cause it to cut the moving material at right angles" both "for its downward and upward action." The inventors claim as their improvement the imparting of these intermitting motions to the cutter and to the guides "through the agency of a 'star wheel.'" This "star wheel" is a toothed wheel with the teeth rather wide apart; teeth mounted far apart on a revolving shaft gear into it, so that the wheel receives from the continuous motion of the shaft an intermittent motion which it communicates through suitably arranged levers to the part of the machine which it has to actuate.

[Printed, 8d. Drawing.]

A.D. 1863, September 22.—No 2335.

EFFERTZ, PETER.—(*Provisional protection only.*)—"Improvements in machinery or apparatus for making bricks, tiles, pipes, and other similar articles," applicable to such machinery as forces the material through a die or moulding orifice. This invention has for its object "giving motion to the cutting frame and wires and stopping the machine at the required intervals of time." The cutting frame is moved by connecting it to one end of a lever, the other end of which fits into an eccentric groove sunk in a revolving disc carried on a shaft, and every revolution of the disc so moves the lever as to cause the cutting frame to perform the desired movement. To cause the stoppage of the machine at intervals, on the same shaft which carries the grooved disc are fixed projections, which at each revolution disconnect a "clutch box" from the original moving power of the machine, "and thus the motion of the machinery is stopped." It may be set in motion again by hand or by a "self-acting contrivance," as preferred.

[Printed, 4d. No Drawings.]

A.D. 1863, September 22.—N° 2337.

BOND, JOHN, and BOND, JAMES.—These inventors claim the general arrangement of a machine for making bricks by forcing clay through a die. In this machine the clay is fed into a pug-mill, and at the end of the pug-mill are placed one or more knives, fixed on to its shaft, and which cut off the clay in flakes. The material in this form is received on to two rollers, and passing through the space between them is deposited by them upon two or more “worms or screws” gearing into one another, and which carry it forward to the die or moulding orifice and force it through the same.

In the machine shewn the pug-mill is horizontal, and below its mouth are fixed the rollers, also horizontal, but with their axes at right angles to that of the mill, and the “worms” again lie directly below the rollers, and with their axes parallel to those of the rollers; but these positions may be varied.

2. The inventor claims as novel the revolving knife or knives for cutting the clay into flakes at the end of the pug-mill shaft.

3. Also a “double angle die” and a “grooved roller,” shewn on the drawings. This last is “to be used when making drain “tiles,” being suitably shaped “to receive the “tiles from the “dies” and keep them in shape.

[Printed, 10d. Drawing.]

A.D. 1863, October 1.—N° 2402.

BELL, THOMAS.—(*Provisional protection only.*)—This “invention consists in making bricks and tiles of the by-products or “residue remaining in the retorts used in distilling products “from bituminous shales or schists or other like minerals containing aluminous matters.” This material may be moulded direct “as it comes from the retorts,” or tempered with water, or mixed with “natural clays or earths.” and then burned.

[Printed 4d. No Drawings.]

A.D. 1863, October 3.—N° 2428.

BONOMI, IGNATIUS.—(*Provisional protection not allowed.*)—“This invention has for its object improvements in the construction of arches and other like structures” by the employment of a new description of brick. This brick is to have at one side

projections, and at the other side corresponding channels either "fluted and reeded, grooved and filleted, spine and hollow, rebated and tongued, or wavy." The bricks may be curved "and also made into ridge bricks," and whenever used the projections on one brick are intended to fit into the corresponding depressions on the edge of the adjoining one.

[Printed, 6d. Drawing.]

A.D. 1863, October 15.—N° 2526.

CLAYTON, HENRY.—"Constructing and arranging buildings "for drying bricks, tiles, and other articles with apparatus for "supplying artificial heat, and for ventilating the buildings in "such manner that the vapours and moistened air may be caused "to pass from the articles to be dried downwards into suitable "channels to conduct the vapours and air away, fresh and warm "or heated air being at the same time introduced into the "building, by preference, at the upper part thereof." The inventor also claims as part of the invention "the general "construction or arrangement of buildings" for these purposes, as shown and described in his Specification. These consist of an oblong drying room with a furnace at one end. The smoke flue of the furnace is carried quite round the room, mostly above ground, to heat it. A fan is caused to blow in air, wholly or partially heated by the furnace, through perforated air channels, into the upper part of the room; this supplies the hot and dry air. On the floor of the room are formed perforated extracting air channels "forming hollow hakes the length of the drying "room," and on these are stacked the articles to be dried; the moist air which has passed over them is extracted by an "exhausting machine or air pump," connected to the ends of these channels. Means of regulating the amount of air taken out or thrown in and its temperature are provided, and if wished, part of the extracted moist air can be returned to the room in order to prevent too rapid drying.

[Printed, 2s. 6d. Drawings.]

A.D. 1863, October 16.—N° 2535.

STUBER, FREDERICK GEORGE.—(*Provisional protection only.*)
—"Improvements in lamps and stoves for the application of blast "heat" to various purposes.

In the blast stove a blast of air "out of any blowing machine," is "passed under and through the fire," and the flames are "deflected to the earth by the shape of the roof of the stove."

The lamp whether with one or more wicks has a flexible blow pipe with an adjustable nozzle connected to it; the current of air being passed through the handle of the lamp, which is used as an air chamber.

The inventor proposes to employ these contrivances for several purposes, among which is "to put a sort of glaze or enamel on stone, brick, and the like, to give them a hard surface by which the absorption of damp would be prevented or retarded."

[Printed, 4d. No Drawings.]

A.D. 1863, October 17.—N° 2550.

DE WYLDÉ, FÉDOR.—Employing "the aqueous solution of alumina (or the aqueous solution of alumina with lead)" "in combination" with "the soluble silicates of soda or potash" for "the induration of stone, cement, stucco, brick, or other analogous materials; also the manufacture of artificial stone."

In indurating or waterproofing any of the above materials, the surface to be treated is first saturated with the aqueous solution of alumina, or of alumina and lead. "When dry, or nearly so," "the solution of soluble silicate of soda or potash" is applied; this combines, with the solution first applied, to form "a silicate of alumina (or a double silicate of alumina and lead)." "This process may be repeated as often as found necessary" thoroughly to fill the pores of the material.

Artificial stone is to be made with sand, chalk, lime, or the like, "connected with a silicate of soda or potash of heavy specific gravity," and then kneaded up with the aqueous solution of alumina (or alumina and lead), shaped into the required blocks, which are allowed to dry and harden; or the alumina solution may be applied after the other materials have been both mixed and shaped. In some cases, however, the solid materials are first mixed with the alumina solution, and subsequently the silicate of soda or potash is applied "by kneading" or saturation, accordingly as circumstances may require."

[Printed, 4d. No Drawings.]

A.D. 1863, October 28.—N° 2668.

CAVANAHA, JAMES, and CAVANAHA, JOHN. — (*Provisional protection only.*)—Apparatus for making bricks, and tiles, and washing clay.

The inventors employ a cylinder; this they fill with clay which is to be pressed out of it through a sieve. Below the cylinder "is a sliding table with moveable moulds for the reception of the bricks or tiles when pressed."

The clay is to be prepared by being worked up with water "into a fluid state;" in doing this "fan wheels and cutters are employed, or any other movements which may be considered best." It is then passed along pipes and through sieves into receptacles. A drying oven is to be employed for partially or wholly drying the bricks before they are burnt.

[Printed, 4d. No Drawings.]

A.D. 1863, October 31.—N° 2708.

JONES, EDWARD.—The first part of this invention relates to improvements in the manufacture of bricks. In carrying it out the inventor makes use of the machinery which formed the subject of a patent dated 26 July 1858, No. 1683, with improvements which received provisional protection 1st May 1863, No. 1096. A vertical pug mill, with "additional spiral knives," forces the clay into "feed boxes, with horizontal pistons acted upon by cams." Each stroke of each piston forces a certain quantity of clay through a moulding orifice. A wire cutter severs this clay and the block so cut off is received on to "endless chains or friction rollers," and is turned, sanded, and conveyed to a moulding press, where it is consolidated into a brick. "Plates covered with felt to prevent adhesion" are attached to the pistons of the moulding presses. The bricks are lastly delivered on to pallet boards from the press and removed. The machine can also be adapted to form drain pipes.

[Printed, 8d. Drawings.]

A.D. 1863, November 21.—N° 2932.

WILLIAMS, WILLIAM.—This inventor describes in his claim, this invention as "machinery for making bricks and other like articles in which a travelling presser is made to force clay through openings in a trough or framework."

In "that modification of" his "invention which" the inventor considers "most advantageous for general use," the trough is of metal, and forms a ring of considerable size, its sides slope, and it has "openings in the bottom corresponding in shape to the "bricks to be made." Between and above the said "openings" cross pieces may be introduced converting the trough into a series of small open hoppers. "Moulds of the ordinary hand class" can be used, and if employed, are to be laid on a platform immediately below the openings, but moulding orifices and wire cutters may be used; or the moulds may be adapted to tiles.

"Half tempered clay may be used," fed into the trough by hand or otherwise, and one or more radial arms, pivoted on the centre of the ring, and worked by horse or other power, carry "edge-runner like pressers," i.e., flat rollers free to revolve, and which travel round the trough; on the edge of these rollers projections are formed, spaced off to correspond exactly to the orifices leading to the moulds. On the end of other radial arms scrapers can be fixed which follow the roller and serve to throw the clay from the edge of the trough into its bottom. The moulds, where moulds are used, are to be removed after the presser has gone over them, and replaced by empty ones; "where very firm and "smooth skinned bricks are required, however, the pressers may "pass over the moulds before they are removed from the platform "oftener than once." The inventor reserves the right to modify details.

[Printed, 10d. Drawing.]

A.D. 1863, November 23.—N^o 2944.

BAWDEN, PETER.—(*Provisional protection only.*)—This invention relates to improvements in brick machines, intended to extend their productive power and make them self-acting.

The revolutions of a vertical shaft communicate motion to all the parts of the machine. "The shaft operates the clay knives, "and the horizontal cam wheel moving two cams which revolve "under two friction pullies." These friction pullies are connected through cranks, the one with a counterweight for working the brick press, the other, "with a bolt for drawing out the brick "mould." Other mechanical contrivances are partially set forth, but the description of this invention and of the mode of its working is very incomplete.

[Printed, 4d. No Drawings.]

A.D. 1863, November 23.—N° 2947.

CARR, THOMAS.—“Improvements in machinery for amalgamating or intermixing dry, semi-fluid, or aqueous materials, and for agitating solids with liquids.” This machinery is “applicable to tempering mortar and clay” among other purposes, and the improvements include—

1. “Mechanical agitators” which consist of “a series of flat blades set at angles to their line of motion, when two separate sets of such blades are worked in combination and rotate round a common centre at varying speeds in the same or opposite directions.

2. “Vats or pans” with these agitators so fixed that they can be tilted up to empty out their contents, and so geared that the motion of the agitators is maintained during the tilting.

3. Applying heat to the pan by steam or gas burners.

4. A “mode of gradually distributing acid or other liquid upon materials” in such apparatus. The liquid is held in a vessel fixed upon the upper end of the central shaft which carries one of the sets of blades, and is conveyed to the materials through a pipe along one of the radial arms to which the blades are fixed. This pipe may be perforated. A coned cover to the vessel is shown on some of the drawings intended to prevent its contents from overflowing when the vat is tilted up.

5. “A centrifugal or exhausting fan for removing noxious fumes given off by materials operated upon by mechanical agitators.”

6. “The arrangement or combination” of the above separate portions of the invention in the manner shewn on the drawings and described in the Specification. Four modifications are shewn on the drawings.

7. “The combination of one set of moving agitators with bars or blades fixed in the bottom of the vat or pan.”

[Printed, 2s. 6d. Drawings.]

A.D. 1863, December 12.—N° 3145.

PLATT, JOHN, and RICHARDSON, WILLIAM.—This “invention relates to improvements upon that machinery” for the preparations of clay for the manufacture of bricks, tiles, &c. “for

" which Letters Patent were granted to " the same inventors A.D. 1862, September 4, No. 2450, and consists in :—

1. Using in place of, or "in conjunction with," the revolving tube of the former machine "a stationary trough within which " are situate two screws turning in contrary directions or at " unequal speeds so as to effect a tearing action upon the clay." These screws "are of considerable length, say thirty yards," and deliver the clay at their further end.

2. "The use of a screw or screws in conjunction with a steam " chest or other heating medium " to dry the clay. The bottom and sides of the trough above described are to be double and steam introduced into the hollows so formed. If this does not sufficiently dry the materials the "screws may be covered in and " a blast of hot air blown or drawn by a fan or other apparatus " over the surface of the material."

3. "The use of a screw or screws for the above purposes " moving in a trough or troughs which will allow the smaller " particles to fall through." To effect this the trough may have at intervals "grids in its lower part" and such materials as pass these "grids" may "drop into another trough furnished with a " revolving screw, by which they may be conveyed forwards."

4. The use of "smashers;" and combining them with the revolving tube of the old, or the screws and trough of the present invention, or with both. The "smashers" are revolving drums "armed with a number of projecting teeth" that are "arranged " as spirals." Two of these revolve in a chamber, the top of which is closed by two plain drums "mounted upon levers" and having scrapers touching the periphery of each. "The drums " are caused to revolve to prevent the clay being plastered " thereon," and they rise with the levers if an undue mass of material is caused to press against them.

5. An improvement in the revolving tube of the original machinery, namely, using "openings therein for the smaller particles " to pass through." These are obtained by making the tube in lengths, and when bolting them together "placing filling pieces " between the flanges," the spaces between these filling pieces being open. A cranked lever with a weight counterbalancing it at one end enters each of these spaces in turn as the tube revolves, "and clears the opening if it be choked."

[Printed, 1s. 6d. Drawings.]

A.D. 1863, December 18.—N° 3199.

CLAYTON, HENRY.—“Improvements in machinery for manufacturing bricks.” This machinery operates upon “moulded” or partially formed bricks or masses of brick earth and consolidates and finishes them. The moulds, by preference four in number, are recesses in the periphery of a cylinder revolving on a horizontal axis. Each mould has a moveable bottom made hollow to contain lubricating matter similar to that applied to hand-power presses described in this inventors’ Specification, A.D. 1844, March 30, No. 10,132. “And the opposite pairs of moveable bottoms are combined together by bars” slotted to let the axis pass. The motion of the cylinder is intermittent, and each mould as it becomes horizontal, faces a “pressing plate,” which slides to and fro. A brick is introduced upon a table furnished with proper guides between this plate and the mould, and the plate is then forced forward and drives the brick in before it, and compresses and finishes it in the mould. The brick is discharged at the moment when its mould is undermost by a plunger, which “is caused to enter the mould which for the time is uppermost and to press on the moveable bottom therein, by which the moveable bottom of the mould containing the finished brick will be pressed or pushed through its mould,” and it is received on an endless apron and carried away. This plunger “may be arranged to contain or receive lubricating matter.” The pressing plate is actuated by a crank. The intermittent motion of the mould cylinder “which is caused to rotate one-quarter round for each revolution of the driving shaft” is given by the action of a rod connected at one end to a crank on that shaft, the other end “acting in succession against four curved teeth.” Springs “prevent the rebound of the chamber at each movement.” The motion is communicated to the driving shaft of the whole machine through a pulley, loose on the shaft but with a ratchet inside “the stop of which is attached to the shaft so that the machine can never be disarranged by turning the machinery the wrong way.”

[Printed, 10d. Drawing.]

A.D. 1863, December 24.—N° 3266.

DUCKETT, JAMES.—(*Provisional protection only.*)—Arranging kilns, furnaces, and flues with a view to economy of heat

forms the subject of this invention. Two or more kilns for burning bricks, tiles, or other articles are connected together and also connected "to the furnace or flues of one or more steam boilers, and to the drying shed, and to the chimney, by flues furnished with dampers."

The spare heat from any kiln may be thus at pleasure conveyed to an adjoining kiln, "or to the furnaces of the boilers, or to the furnaces for heating the shed, and thence to the chimney." The cheapest coal may be consumed instead of good coal.

[Printed, 4d. No Drawings.]

1864.

A.D. 1864, January 23.—N° 196.

PLATT, JOHN, and RICHARDSON, WILLIAM.—This "invention relates to pulverizers or revolving screens used in the preparation of clay, and its object is to prevent the material adhering to the bars thereof." It consists of, "firstly, the application of heat to the bars," or "secondly, as applied to the said revolving screens or pulverizers, the use of teeth or other such instruments which successively enter between the bars thereof."

In all the drawings the pulverizers are represented as hollow cylinders to which rotary motion is given, and the sides of which are made of bars fixed a short distance from each other and running the length way of cylinder. Two modes of carrying out the first portion of this invention are shewn. In the first a current of heated air is caused to issue from a pipe and impinge upon the bars. In the second a steam jacket of the shape of a portion of a concave cylinder encases a large segment of the periphery of the pulverizer, and the bars of the latter are heated by radiation from the steam jacket.

A method of carrying out the second part is shewn and described. The teeth which are to enter between the bars of the pulverizer are rivetted to an endless band passing over two rollers, one free to rotate on a fixed shaft parallel to the axis of the pulverizer, and the other carried by levers projecting from this same

shaft. Thus the weight of the levers and of the second roller causes the endless band to bear on the top of the pulverizing cylinder, its teeth entering between the bars force off the adhering clay and cause it to drop into the interior of the cylinder, and the band itself is carried onwards by the movement of the revolving pulverizer.

[Printed, 1s. 2d. Drawings.]

A.D. 1864, February 1.—N° 268.

PRINCE, ALEXANDER.—(*A communication from Victor Duprat.*)—(*Provisional protection only.*)—Improvements in the material from which artificial pavement is manufactured, also applicable to pottery ware. The kinds of clay “which serve to make pottery” called artificial brown freestone and also other clays “are to be mixed according to their character with other substances, and also with some materials which are fusible, and with products which partly attack the clay and cause it to run.”

A list of such substances is appended. The mixture is to be “moulded into blocks or slabs,” and when dry pressed and burnt.

[Printed, 4d. No Drawings.]

A.D. 1864, February 19.—N° 435.

SCRIVENER, ROBERT.—(*Provisional protection only.*)—“Improvements in the preparation of clay and other plastic materials;” also “in drying articles manufactured from the same.”

1. With a view to make “what is technically termed ‘slip’ into a body of sufficient consistency to be used in the manufacture of china, earthenware, stoneware, encaustic tiles, and terracotta,” the slip is poured into a “frame” of a suitable depth with “a perforated bottom,” over which “a layer of calico” has been previously placed. The air is then, by means of a fan or air pump, exhausted from a chamber below this “frame;” in consequence of which “the water is then expelled from the ‘slip’ by the pressure of the atmosphere upon the surface, and the ‘slip’ is consequently brought to any desired degree of consistency.”

2. The inventor further proposes to establish a constant current of air through drying chambers by exhausting the air from the chamber by means of a fan through openings at the bottom, and admitting fresh air through openings at the top. “When warm

"air is required" he throws it into the drying chamber by his fan, "and the vapour is carried off by the openings at or near the top."

[Printed, 4d. No Drawings.]

A.D. 1864, February 25.—N° 473.

JULLIENNE, AUGUSTE, and DELACOMBE, JACQUES ERNEST.—A "machine intended to mould bricks dry under pressure." The moulds, of which two are shown in the drawing, are fixed in the upper part of a strong framing; they are open at top, and each has a moveable "piston or rammer" at bottom, and a cap is provided which covers them when compression is going on. The pressure is given by a long wooden lever, which turns on a pivot below the moulds, and which, when worked, draws the cap down upon the clay with which the moulds have been previously filled by means of connecting rods, and at the same time forces up the piston or rammer, and consolidates the contents of the moulds. "This pressure exercised, the operator releases the "wooden lever," which returns to its position by the action of a weight, chain and pulley, removes the cap from the moulds, and working a small separate lever provided for the purpose, raises the pistons with the bricks on them so that the latter can be removed, and the moulds are then ready to be refilled.

[Printed, 6d. Drawing.]

A.D. 1864, February 25.—N° 476.

PERRY, GEORGE.—"The object of this invention is to utilize "the slag or cinder obtained from blast furnaces in a more "economical manner than heretofore." It has been customary to reduce this material to powder, "which process is very expensive." This invention proposes to effect "the disintegration or "breaking up of blast furnace slag or cinder by subjecting it "while in a fluid state to jets of steam, air, or water." "The jets "should take the form of a thin sheet, and be directed so as to "strike into the descending stream of fluid cinder. The fluid "cinder thus acted upon will be driven forward by the mechanical "force of the jet and be thereby caused to assume the form of "threads as it cools in falling through the air, which threads, by "intermingling, present an appearance not unlike coarse wool." The material thus reduced and collected in a proper receiver can be very readily pulverized.

It is proposed to re-melt old slag and treat it in the same manner. "The powdered slag or cinder may be used in the manufacture of bricks, artificial stone, or cements," or as manure.

[Printed, 4d. No Drawings.]

A.D. 1864, March 8.—N° 579.

NEWTON, ALFRED VINCENT.—(*A communication from Friedrich Edouard Hoffmann.*)—(*Provisional protection only.*)—"Improve-
ments in the preparation of clay for moulding bricks and other
"articles" form the subject of this invention. In order to bring
the clay into a state in which it can be moulded and subsequently
rapidly dried without the articles made from it being liable to
become cracked in the drying, it is proposed to heat the wet clay
"in a closed vessel to a temperature of, say, 158° to 212° Faren-
heit without diminishing the water contained in the clay;" or,
preferably, to heat the clay in a state of powder and "mix it up
"to a paste with hot water;" or to heat and wet the "powder
"at the same time by steam." Or ground clay, "heated to 390°
"to 480° Far.," may be mixed with a mass of cold wet clay,
and so attain the desired object.

[Printed, 4d. No Drawings.]

A.D. 1864, March 12.—N° 634.

PLATT, JOHN, and RICHARDSON, WILLIAM.—Machinery
"for breaking up or pulverizing clay for the manufacture of
"bricks" or "other materials, by causing a series of cylinders
"to throw the said materials, by centrifugal force, from the one
"to the other. These cylinders do not, therefore, act as ordinary
"crushing surfaces, but revolve apart from each other."

In the machinery shown on the drawings three cylinders, fluted
on their peripheries, are shown, and the clay, in a half-dried
state, is fed from a hopper, having a moving roller and a scraper
at its mouth, into the space between the first cylinder and a
curved guide plate. Where this guide plate ends the material is
thrown, by centrifugal force, into the second cylinder, which
carries it behind a second guide plate and delivers it on to the
third. Two, or any greater number of cylinders, may be em-
ployed. The projecting parts may be separate, bolted on to the
cylinder, and adjustable when worn, or the cylinders may be plain.

When clay is being crushed the inventors heat the guide plate by forming a chamber behind it and admitting steam thereto.

[Printed, 1s. Drawings.]

A.D. 1864, March 22.—N° 720.

EFFERTZ, PETER.—(*Provisional protection only.*)—This invention relates to the mechanical contrivances “for giving motion to “the cutting frame and wires” of a brick-making machine having those appliances, and for stopping the machine at intervals, and is similar to that described in the Specification of the same Inventor A.D. 1863, Sep. 22, No. 2335.

The cutting frame is worked by a lever, one arm of which travels in “an eccentric groove” cut in a disc, to which rotary motion is communicated. The machine is periodically stopped by a stud on a rotating shaft throwing the shafting out of gear, and can be started again by hand.

[Printed, 4d. No Drawings.]

A.D. 1864, April 5.—N° 841.

MARTIN, STEPHEN, Junr., and YOUNG, EDWARD. — (*Provisional protection only.*)—“Fire-resisting cements and materials” fire-bricks, crucibles, lining of furnaces, &c., &c.

Some such “ore of titanium or titanic acid” as those known as “rutile or ilmanite” is to be pulverized and mixed “in about “even proportions with ground ganister” or pure silica, moistening “with milk of lime.” Or the ore may be mixed in satisfactory proportions with “carbon, steatite, or alumina or silicate of “alumina,” moistening with “water only, or water with sulphate “of potash, fluor spar, or any other suitable flux or cement.”

[Printed, 4d. No Drawings.]

A.D. 1864, April 13.—N° 933.

CRAMPTON, THOMAS RUSSELL.—(*Provisional protection only.*)—This inventor says,—“According to my invention in moulding bricks and other similar articles from clay and brick earth, “I use comparatively dry clay, such as is worked in the machines, “and I force it into all the angles of the mould by projecting or “dropping it into them from a considerable distance.” This is “most conveniently done by raising the material” to the top of

" a platform or scaffolding, and letting it fall by gravity therefrom. The necessary speed may, however, be obtained by the use of apparatus to project the clay or earth."

[Printed, 4d. No Drawings.]

A.D. 1864, April 21.—N° 1002.

JONES, JOHN.—" Moulding clays, earths, and other materials "capable of being so treated in a dry state" by passing the material through a reverberatory furnace, and thence through a moulding machine.

The clay after being "passed through edge rollers" travels through the furnace on an endless chain armed with teeth "that tear it and well amalgamate it," and is delivered by the help of a revolving disc and scraper; or, if it has to be raised, "by means of elevating buckets" into the hopper of the moulding machine. From this hopper the clay is fed into cavities ranged round the side of a large hollow drum mounted on a horizontal axis, and to which an intermittent rotary motion is given. As each cavity charged with clay reaches the lowest point of its circuit, its contents drop into a mould immediately below; this mould has moveable dies on every hand, the one which compresses the top end of the brick being within the drum, and being caused to advance through the cavity lately occupied by the loose clay. When the brick has been moulded and consolidated by pressure, the top die is withdrawn, and the lateral dies also; but the lowest die continuing to rise returns the moulded brick back to the cavity out of which its materials had dropped. The drum now advances a step and moves away the finished brick towards the spot where it is delivered, while at the same moment the lowest die drops back to "its original position at the bottom of the mould, and the mould is ready to receive another charge of clay." The escape of the loose clay, and also of the moulded bricks from the cavities of the drum, except at the proper points, is guarded against by providing portions of the drum with "a casing or cover."

[Printed, 10d. Drawing.]

A.D. 1864, April 21.—N° 1009.

POTTS, FERDINAND, and HARVEY, CHARLES.—"Forming, ornamenting, and coating with suitable vitreous material in
B. & T.

"one or more colours the surface of bricks for garden bordering and other like suitable purposes," in a press so arranged that after moulding the mould may be removed "in a direction at right angles from the general face of the article moulded;" or where the object is of a form that requires it, this mould may be in two parts, and may "divide and separate as it is elevated from the work for the purpose of removing the brick from the mould after formation."

The press shown and described is vertical, and to be worked by hand. Clay enough for one article is placed on a rising and falling plate, called by the inventor a "false bottom." The mould being adjusted over it and held in place by a "strong clip," the clay is forced up into it by a lever acting upon a screw which raises the false bottom. Pins which had been held in place at the sides of and within the mould by a spring are now withdrawn laterally by means of a second lever, which so acts through connecting rods upon a friction roller as by means of it to force apart two inclined planes, to each of which are attached some of the pins. The removal of these pins leaves "dowel holes" in the sides of the moulded article. Lastly, a third lever with its connecting rods is made use of to lift up the mould from the work, the detaining clip having been first unfastened, and guiding grooves are arranged which cause the top mould or moulds to leave the work at the angle or angles desired. The further action of the last lever elevates the false bottom to such a height as permits the finished brick to be removed. A glaze is to be given by the use of some of the ordinary glazes or enamels.

[Printed, 10d. Drawing.]

A.D. 1864, April 23.—N^o 1030.

PRATT, JOHN MARSHALL.—"Improved brick-making machinery," "in which an endless band or chain bears or carries brick moulds, and a rotating wheel or drum and plate, or two rotating wheels or drums give pressure to form bricks."

The band is to be flexible.

[Printed, 10d. Drawing.]

A.D. 1864, April 29.—N^o 1076.

SMITHETT, RICHARD HUDSON, and DAVIDSON, JOHN.—An invention applicable to the manufacture "of bricks, tiles, or

" blocks from clay or artificial stone for ordinary building purposes, armor plates," or for any constructive purposes where bricks, tiles, blocks, or plates are required to be fastened or banded together in a stronger manner than ordinarily." This invention consists in so " rolling, casting, moulding, or pressing such material " as to " produce " " bricks, tiles, blocks, or plates having on one side " or edge " projections of a pyramidal, conical, hemispherical, octagonal, or other analogous form, and on the other side corresponding holes or depressions of a similar form," all so arranged " that they shall interlock " when the articles " are used for constructive purposes."

[Printed, 8d. Drawing.]

A.D. 1864, April 29.—N^o 1077.

DAVIDSON, JOHN.—(*Provisional protection only*).—This invention consists in moulding the bricks intended to be used in building arches " in the precise taper form " required. Further, in casting such bricks in moulds the top and bottom of which are hinged and adjustable, " so that bricks or blocks of any required degree of taper may be made in the same mould."

[Printed, 4d. No Drawings.]

A.D. 1864, April 29.—N^o 1078.

SMITHETT, RICHARD HUDSON.—" This invention is designed " to afford a ready means of fastening, connecting, or binding " bricks together, especially for corners, foundations," and other parts of a building requiring extra strength, " by casting, moulding, or otherwise forming two holes in such bricks," *i.e.*, one near each end of each brick, and going quite or nearly through from top to bottom, " and connecting the same by pegs or " dowels." The holes must be so placed as to come exactly over each other when the bricks are laid. The dowels may either be solid, or of metal and hollow, " and filled with clay, cement, wood, " or other suitable material."

[Printed, 8d. Drawing.]

A.D. 1864, May 9.—N^o 1170.

CHAMBERS, JAMES.—This " invention has reference to that " description of machinery or apparatus for making bricks in

" which the clay is deposited from the pug-mill into dies or " moulds upon a revolving table." According to the improvements of this inventor "the moulds are removeable from the " revolving table, and are made to pass underneath a box projecting from the pug-mill, in which box a stamper, hammer, or " ram is caused to work up and down for the purpose of pressing " the material into the moulds."

The escape of material from the box is guarded against by making the moulds with flanges to their upper edge, which flanges when the moulds are in place touch one another, and so form a continuous surface, and by the sides of the clay box being " made moveable, so as to rest upon the moulds." The bricks are to be removed, and the moulds replaced by hand. The " stamper" and the revolving table can receive motion from the pug mill shaft.

[Printed, 8d. Drawing.]

A.D. 1864, May 11.—N° 1196.

GISBORNE, THOMAS MATTHEW.—"Improvements in kilns " for burning bricks, tiles, and other earthenware or ceramic " articles, limestones, and ores." These improvements have reference to systems or series of kilns "intercommunicating in such " a manner that the air for supporting combustion in the kiln " that is being fired, first passes through one or more kilns that " have been fired," and consist chiefly "in so combining a number " of kilns working on the principle of the Newcastle kiln (in " which the combustion of fuel takes place at the one end, " whilst the chimney communicates at or near the floor with the " other end) that the back or chimney end of one kiln can communicate at pleasure with the front or combustion end of " another kiln, or with a separate chimney or flue." Also in making such kilns "taper from the combustion end to the chimney end;" and also in arranging these tapering "kilns" side "by side alternately in reversed positions." The chimney end of each kiln in these series has a "flap valve" or "damper," which can be at pleasure set so as either to connect it with the adjoining kiln or with a flue running under the whole series and communicating with the common chimney.

Another arrangement of these conical kilns is shown, in which they form a circle having a common chimney in the centre; flues

under the floor lead from the "chimney end" of each kiln, to the "front or fire end" of the adjoining one, the course of the current of air being as before controlled by dampers. Each kiln has its own door, and may have its separate chimney for use if it is thrown out of connection with the series. The necessary "apertures through which fuel is introduced into the kilns when "burning," and apertures in the roofs for the escape of steam are provided for.

[Printed, 1s. Drawing.]

A.D. 1864, May 17.—N^o 1247.

BAWDEN, PETER, WILLIAMS, JAMES, and WILLIAMS, SAMUEL.—"Machinery for making bricks" in considerable numbers at once. This machinery consists of a pug-mill placed upright and having its main shaft continued through the bottom of the mill to carry a "cam wheel." Friction pulleys, carried by two different crank levers, bear on this wheel, and the levers which are moved by the cams at each revolution, communicate motion through a system of cranks and connecting rods to the remaining parts of the machinery. The pugged clay is forced out of the mill on to and through a grate, and the machine first brings up under this grate a tray of brick moulds to receive the clay, and next brings down a "hinged press" on to the surface of the clay so as to force it into the moulds; lastly, a counterweight raises the press ready for a fresh series of moulds to be introduced. The mechanical combinations for actuating these parts of the machine, include connecting the bar which forces out the moulds to the lever from which it receives motion by a weighted cord, so arranged that if any unexpected obstacle is met with, such as a stone, the cord may lengthen, raising the weight, and so breaking or stopping the machine may be avoided. This and other mechanical combinations which cannot be described without the illustrations are included in the claim.

Pallets to receive the moulds in which the bricks are formed are brought up to the grating on a specially-constructed barrow with an inner frame which can be raised at pleasure "by means of "a crank hand lever." The barrow is received on a frame furnished with friction rollers and a sand box. "When the barrow is "charged with moulded clay a second barrow is driven in which "forces the loaded one forward," and it can be wheeled away

from the frame. When the bricks are to be removed from the barrow the inner frame is raised as mentioned above, and the pallets on it are then readily taken off.

[Printed, 10d. Drawing.]

A.D. 1864, June 7.—N^o 1417.

WADE, JOSEPH ARMYTAGE.—Machinery for pugging and rendering fit for use “clay or other substance” which has undergone little or no previous preparation, forms the subject of this invention. The clay is fed into a hopper within which revolves a central shaft carrying knives. It passes thence into a chamber of a conical or cylindrical shape, and the central shaft, prolonged into that chamber, carries a “hollow cone with knives or cutting blades set round it.” In the sides of this cone there may be perforations, and on it near its base, where it approaches the walls of the chamber, occur “a series of ribbed surfaces” which crush the material against corresponding “surface pieces fixed to or forming part of the inside of the stationary case, previously to the material being ground between the succeeding plain surfaces.” These plain surfaces form the base of the cone and case. “The material, after being ground,” together with that which being lighter had “dropped into the interior of the cone” is received into boxes “from which it is forced forwards by means of pistons fitting the same (such pistons being worked by crank discs and connecting rods or other suitable mechanism) through nozzles or conical apertures” in a plastic state fit for use.

[Printed, 1s. 2d. Drawings.]

A.D. 1864, June 10.—N^o 1446.

FOXLEY, JOHN.—“The formation and use of bricks with ribs or projections having holes through them” “in which pieces of wire or other material may be threaded” to secure the branches of trees to walls.

The ribs are, by preference, “of a semi-cylindrical or half round form,” and arranged to run horizontally along the courses of brick-work. “The ribs may, however, be in other directions and of other sections.

The bricks may either be of the usual shape and size or of any other form or dimensions found suitable. A coping brick, and a ribbed brick that is “thin and may be let into a wall already built,” are among those figured and described.

It is proposed that the perforations, which need not necessarily be at right angles to the rib, shall be made while the clay is soft by the action of "a frame or block moving in vertical guides, and "having several wires or prongs disposed as required."

[Printed, 10d. Drawing.]

A.D. 1864, July 16.—N° 1504.

BODMER, RUDOLPH, and BODMER, LOUIS RUDOLPH.—The first part of the improvements claimed by this inventor as being included in his invention relate to "the manufacture of artificial stone," and to "apparatus and combinations for slaking, conveying, and measuring the lime" and sand proposed to be made use of as materials in that manufacture by him.

The remaining "invention of improvements in presses for "making artificial stone, bricks, and other articles, consists in "certain modifications of the hydraulic press and in combinations "with the same." A compound press with hydraulic rams above and below the "table containing the moulds," is first described. In this a preliminary downward pressure is given by "fallers or plungers," which may fall by their own gravity counterbalanced "more or less, if desired, or the fall broken by air cushions or "springs;" after which, "water from a high pressure accumulator is now admitted to top and bottom cylinder simultaneously "or otherwise, and the bricks or blocks receive the final pressure." One or more smaller cylinders or rams are used for raising the "faller" and for raising out of the moulds the moulded bricks, but "they can also be raised by the large ram actuated from a "low pressure accumulator."

In another improvement the lower ram worked "from a low "pressure accumulator" gives the first pressure, "the liquid from "the high pressure accumulator being turned on" to complete the moulding. "The top cylinder and ram would in this case be "modified." Another improvement "consists in constructing "presses with a bottom cylinder only for giving the final pressure, "and the small cylinder for lifting the bricks to the surface." Some other combinations of hydraulic presses intended to economise power and increase speed are also shown or described. In all cases it is proposed "to work the valves of the several hydraulic "cylinders by machinery" to be "actuated from cams, eccentrics, "or scrolls fixed upon a shaft." A "feed slide" for conveying

material to the moulds obtains a to-and-fro motion in the same manner.

Hardening the bricks by applying "chemicals" in a chamber "when a partial vacuum is established" also forms part of the invention.

[Printed, 1s. 4d. Drawing.]

A.D. 1864, June 24.—N° 1596.

CHAMBERLAIN, HUMPHREY, CRAVEN, JOHN, and WEDEKIND, HERMANN.—(*Partly a communication from Friederich Hoffmann.*)—"This invention consists in improvements upon and "modifications of the kilns or ovens for burning bricks, tiles, "limestone, &c." which formed the subject of the patent granted to A. V. Newton, A.D. 1859, December 22, No. 2918, and comprises :—

1. "First, the construction of kilns or ovens in lines, straight or "otherwise, as distinguished from a complete annular or endless "form;" such ovens being intended to work without "perfect "continuity of action."

2. "Second, the combination of a second annular chamber with "a circular or continuous oven or kiln" for the purpose of transferring hot air from one part of such kiln (when subdivided by temporary divisions) to another.

3. An arrangement for carrying "the steam evolved during the "process of drying the green bricks or other goods" into the chimney separate from the smoke.

In carrying out the first part of this invention, a straight kiln having a furnace at one end and a chimney at the other, and holes at intervals in the vault is provided. The hot air passes through the entire length of the kiln, and fuel is dropped down among the goods from above during the burning of them. The bricks nearest the furnace are burnt first and can be removed, and fresh substituted while at the further end of the kiln burning is still going on. Sliding doors to divide such a kiln into compartments may also be introduced. A pottery kiln in compartments is also shown, the heat from the first compartment passing through the others on its way to the chimney, and "the second "compartment" being "fired whilst the first is gradually cooling," and so on. Projections to catch part of the fuel as it is dropped down are introduced to "ensure a uniformity of heat "throughout the full height of the furnace."

In carrying out the second and third parts of this invention the kiln is built like a ring, and is divisible by moveable partitions into chambers. Inside this is built an air chamber which forms an inner ring, the chimney being in the centre. One or more of the chambers of the kiln being charged with "green bricks," part of the heated air from the chambers when burning is going on is caused to enter the air chamber, and from there is conveyed into the chambers containing the "green bricks." The mouths of the various air and smoke passages can be opened or closed, or regulated by raising or lowering conical dampers which fit into the mouth of each passage.

In carrying out the third part of this invention a kiln similar to the last is used, but the smoke and products of combustion are carried off from the chambers at the floor level, while the steam is separately carried off from the crown of each vault into an inner chimney surrounded by the smoke chimney, but only communicating with the latter at "a convenient height."

In burning those materials which shrink, an arch is added sufficiently low to cut off the space left by shrinkage above the contents of one compartment from communicating with the upper part of adjoining compartments; or such substances may be covered with loam and earth which descends with "the shrinkage of such substances." In such cases, also, "the fire-places of the kilns must be enclosed by an open setting of fire-bricks or tubes" to prevent their choking. A tunnel may be formed under the kiln to receive its contents into waggons or trucks.

[Printed, 1s. 6d. Drawings.]

A.D. 1864, June 5.—N^o 1667.

SYKES, BENJAMIN CLIFFORD.—(*Provisional protection only.*)—"The employment of an inverted steam cylinder, piston, and "piston rod" placed over a revolving mould table, with a view to the compression of the clay in the moulds by the direct action upon it of the piston rod, the end of which is provided with a suitable hammer or die for the purpose.

[Printed, 4d. No Drawings.]

A.D. 1864, July 12.—N^o 1723.

DANCHELL, FREDERICK LUDEWIG HAHN.—"An apparatus "by means of which plastic materials, such as dry peat," &c.,

may be prepared for dividing into bricks or blocks and dried. In this apparatus the plastic material is first formed into a slab "by means of a beater or series of beaters," acting upon it as it travels along an endless band "of a strong impervious fabric" and "stiffened by slats or strips of wood and further sustained by a floor or bars of wood." This slab while travelling forward "is divided by any of the well-known means employed in brick making machinery into bricks or blocks of suitable size." These blocks are now carried on an endless band into one or more chambers "through which converging currents of air are made constantly to pass," suitable outlets and inlets being arranged for the purpose; after passing for a certain distance along, one endless band they are made to drop on to another at a slightly lower level and in so doing "are turned over so as to present another surface to the action of the air;" by being thus continuously "carried forward and at intervals turned over they arrive perfectly or partially dry, as may be desired, at the further end of the apparatus." The illustration represents them as traversing the chamber repeatedly from end to end, but "the number of bands and overturnings in any apparatus will be regulated by the nature of the material to be dried." The inventor recommends "about twenty-five feet to be passed over in about a quarter of an hour between each overturn."

[Printed, 10d. Drawing.]

A.D. 1864, July 26.—N^o 1865.

SLATER, JAMES.—A "combined arrangement of machinery for making bricks and tiles," by expressing clay through dies, forms the subject of this invention.

The different parts of this machinery are set in motion by shafting and gearing all driven from one "shaft actuated by a steam engine or other power." A pug-mill is fixed at one end of the machine, and the clay issues from it in two streams through adjustable openings. The streams of clay pass between a pair of pressing rollers "pressed towards each other by weights," but the two streams are kept distinct by a plate of metal fitting into a groove on the face of each pressing roller. A "double trough" which forms in fact two sloping shoots, the bottom of each being formed of rollers, conveys the streams of clay, still side by side, to two pairs of pressing rollers, one pair for each stream of clay:

The material passes between one or other pair of these rollers and is by them forced through two "moulding dies or orifices." The moulded streams of material issuing from the dies may be cut into lengths and conveyed away from the machine by any of the usual methods. Either or both of the pairs of rollers giving the final pressure may be "stopped and started at pleasure."

The shafting and gearing employed are shewn and described with some minuteness, but the inventor does not confine himself "to the precise details" shewn and described.

[Printed, 1s. 2d. Drawings.]

A.D. 1864, August 1.—N^o 1907.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from François Celestin Armelin.*)—This invention relates, first, to "the manufacture of artificial fuel substantially in manner and with the ingredients" described.

2. "The construction of machinery for moulding or compressing artificial fuel or other plastic substances" into blocks. In this machinery the moulds form a ring of chambers or boxes open at top and bottom near the edge of a circular table turning on a central pivot and having teeth on its periphery. Intermittent motion is communicated to this table from "an endless screw, the threads of which are perpendicular to the plane of the axis of the shaft for the greater part and inclined for the remainder of their extent." "The threads of the screw take into the teeth on the periphery of the platform," and when the inclined portion of the thread is passing, the table is caused to turn, during the remainder of each revolution it rests stationary. The material is fed into these moulds from a hopper, and then is carried by the movement of the table to a point where it is compressed between plungers from above and from below, driven together by powerful levers actuated by cams on the same shaft which carries the endless screw. Other cams withdraw the plungers, and the upper ones do not apparently travel with the table, but the continued rotation of the table brings the lower plungers over an inclined plane which causes them to rise again and lift the moulded article out of the mould for removal, after which the further progress of the table brings them into contact with another plane which draws them down again leaving the moulds ready for a fresh change. Vertical rods for perforating

the compressed block are shewn and described as part of the lower plungers, but the mode of actuating them is not shewn. The moulds may be of any desired shape and there may one or more rings of them.

[Printed, 10d. Drawing.]

A.D. 1864, August 12.—N° 2005.

PETHER, HENRY. — (*Provisional protection only.*)—"An improved form of block of burnt clay, stone, wood, or other material for the construction of arches, floors, or pavements," forms the subject of this invention.

The form of block would be obtained from a cube by its having two sides bevelled downwards and the other two sides "bevelled upwards," still leaving "the top and bottom sides parallel." These blocks "when arranged properly with the parallel faces top and bottom" form a compact mass. For paving "some of the edges are removed to give corrugation."

[Printed, 6d. Drawing.]

A.D. 1864, August 27.—N° 2116.

FONTAINE, MOREAU PETER ARMAND LE COMTE DE.— (*A communication from Charles Pasquin.*)—"The manufacture of artificial stones," making use of any material "capable of being amalgamated and hardening as stone after being dried," or "capable of being united and hardened by baking," is contemplated in this invention. In carrying this out small hollow or solid balls carried on iron rods are introduced into the mould; when the block has been moulded the rods are withdrawn, leaving the balls within the body of the article, the hole from which the iron rod is withdrawn being plugged with any suitable material.

In addition to this mode of forming hollows in the blocks, grooves or channels "wider at bottom than at the top," are formed on one or more of their faces, for the purpose of enabling a facing of stone, marble, stucco," or other material to be attached to the block; and such blocks "can be joined together, if required, with key pieces, inserted in dovetail cuts, and afterwards cemented together."

[Printed, 4d. No Drawings.]

A.D. 1864, August 30.—N° 2128.

RUSSELL, CUTHBERT.—(*Provisional protection only.*)—Moulding bricks by forcing "earth or pug" made in any description of pug mill direct into moulds, "placed on a turntable, tray, or "endless chain," to be removed, when filled, "by means of a lever or levers acted upon by an eccentric cam or single arm on the main shaft of the pug-mill." Also, "a flap or piston for pressing the earth or pug into the moulds when considered necessary, acted upon by an eccentric or cam fixed on the main shaft of the pug-mill."

[Printed, 42. No Drawings.]

A.D. 1864, September 16.—N° 2270. (* *)

CRAMPTON, THOMAS RUSSELL.—(*Provisional protection only.*)—"Improvements in kilns used for drying, burning, and cooling bricks, tiles, lime, cement, and other articles." An annular kiln is divided into a number of parts, each of which can communicate with or be separated from each one of two chimneys. Dampers are so placed as "to allow the external atmosphere to enter the air space between the outer walls," and other valves connect the air space with each division of the kiln. Towards the bottom "holes with moveable covers are made through the outer walls" for introducing the fuel. Each division of the kiln has a doorway for introducing and withdrawing the charge. The air heated by cooling the charges can be used for supporting combustion; it "passes either directly from one division of the kiln to that in which the fuel is being burnt, or, by a partition it is deflected downwards or upwards, and passes through apertures in the bottom or the top of the kiln into the divisions next that" in which the fuel is being burnt, where mingling with the products of the burning fuel, "the whole becomes ignited." The products of combustion pass on through the other divisions and dry the charges which they contain in preparation for burning.

[Printed, 42. No Drawings.]

A.D. 1864, September 21.—N° 2320. (* *)

YOUNG, EDWARD.—(*Provisional protection only.*)—"Improvements in the manufacture and application of fire-resisting cements and materials," consisting in the employment of

titanic acid, or of ores of titanium in the manufacture of fire-bricks and cements. The ores are first powdered and then mixed with ganister or powdered silica, and on being moistened with milk of lime the compound is moulded into shape, and then burnt in the usual manner. The ores of titanium may be used in combination "with carbon, steatite, or alumina, or "other silicates of "alumina," and moistened with water only, or water and potash, or fluor spar. The material may be used for "crucibles or pots "for tuyères for blast furnaces, Bessemer vessels, cupolas, and "forges," and fire-bricks generally, and it may be used unburnt as a plaster or cement for lining furnaces, &c.

[Printed, 4d. No Drawings.]

A.D. 1864, September 26.—N° 2360.

HARRISON, JOHN ATKINSON.—(*Provisional protection only.*)—This "invention consists in moulding while in a fluid state, and "afterwards annealing," "the slag or scoria of blast" or other "furnaces;" and applying the material to the same purposes, among others, to which bricks and tiles are applied—"building, "roofing, paving." The slag may be moulded in any manner and annealed in a way "similar to that now employed in glass "manufactories," in "one or more ovens or covered ways."

[Printed, 4d. No Drawings.]

A.D. 1864, September 29.—N° 2398. (* *)

BENNETT, THOMAS.—"Improvements in kilns for burning "quarries, tiles, bricks, and other articles." A kiln, externally of the ordinary shape, is made with fire-places on either side below the bottom, and each arched over, with openings for the passage of the products of combustion "into narrow spaces "between pairs of walls by which the interior of the kiln is "divided into separate longitudinal compartments." "The interior of the kiln is lined with a wall, leaving a narrow space "between the interior of the outer wall and the lining wall, and "into this space the products of combustion of each of the fire-places pass by means of an opening through the arch." At the inner ends of the fire-places there is a hollow space, divided longitudinally, and with openings at the inner end of each fire-place. "Near the upper parts of the pairs of walls and between them "there are horizontal tiles across the open space, and a little

“ below these there are inclined bricks or tiles fixed across the narrow spaces.” The goods are “ piled within the longitudinal chambers, and when they are full they are covered over with tiles and then with sand. Over this covering and over the pairs of walls and spaces between them, bricks or other articles are piled, which from their nature do not require to be burned in closed chambers.”

[Printed, 1s. 4d. Drawings.]

A.D. 1864, October 4.—N° 2440.

DOBSON, THOMAS.—Improvements in a pug-mill for preparing clay for brick and tile making. “ The improvements consist in the use of a propeller consisting of blades of a peculiar angle and form, enclosed within a vertical cylinder or case, and secured to a vertical shaft, by which it is caused to rotate. This shaft is also furnished with knives or breakers, which cut and disintegrate the clay (which is contained in the cylinder) to prepare it for and deliver it on to the screw-like propeller, which forces the clay down with considerable pressure to the bottom of the cylinder, whence it is further propelled through four or more tapering outlets or channels and issued in a length of condensed clay, which is to be subdivided into bricks or tiles by any ordinary mechanism now well known for the purpose.”

In the drawing the propeller blades are shown radiating from the shaft and bent, the front part of each being fixed on the shaft obliquely, and the back being nearly, if not quite, vertical; the “ knives or breakers ” are shewn as straight flat-faced blades, also radiating, fixed in pairs, and with their faces oblique.

[Printed, 10d. Drawing.]

A.D. 1864, October 24.—N° 2627.

ANDERSON, SAMUEL SMITH.—“ Improvements in the manufacture of bricks, tiles,” &c. intended to receive plastic material from a pug-mill and force it through a moulding orifice.

This inventor says, “ My invention consists in the construction at the end of the pug-mill, remote from that at which the raw material to be moulded is introduced, of a cylindrical chamber whose diameter is less than that of the pug-mill. Within this diameter, and mounted upon the revolving shaft of the pug-mill (which shaft passes into the chamber), I place a

“ double threaded screw large enough to fill the area of the chamber, allowance being made for the rotation of the screw within the chamber. This double-threaded screw receives the clay or other plastic material from the pug-mill (where it has been tempered) and propels it in a straight and continuous stream through a die or dies fixed at the end of the chamber remote from the pug-mill.

[Printed, 4d. No Drawings.]

A.D. 1864, October 25.—N° 2636.

HEAP, JOSHUA, and JOLLEY, THOMAS.—“ Improvements in machinery for measuring clay and moulding the same into bricks and tiles ;” also applicable to peat and other substances. 1. Machinery “ for compressing and measuring the clay.” The material descends from a hopper “ betwixt two revolving drums “ or pulleys (one or both of which must have flanges upon them), “ by which it is compressed ;” it leaves these drums in a long fillet or stream, and is “ thence delivered to two revolving drums, “ which are furnished with vanes or blades on their circumference, “ by the action of which the clay is cut or divided into masses of equal size or weight. The portions or masses of clay,” “ being “ thrown off by the help of moveable boards or plates “ placed between the blades, and caused to rise by the action of fixed inclines against which they are carried by the rotation of the drums, “ fall on to an endless belt, by which they are conveyed “ to the pressing apparatus.”

2. The second part of this invention consists in “ the compressing apparatus.” In this apparatus a horizontal “ revolving table, constructed with moulds or spaces passing through it, and arranged in a circle or otherwise, receives the portions of clay. This table turns on its axis with an intermittent motion, and during the time it is at rest a portion or mass of clay is deposited in one of the moulds or spaces ; two pistons then come into action (one on each side of the drum or table) “ betwixt which the portion or mass of clay is compressed, so as “ to form a brick. The pistons being withdrawn the table moves “ on the distance of one space, and the operation is repeated, and “ so on. Another piston, acting on another part of the table, “ forces the bricks out of the moulds or spaces on to an endless “ belt or other contrivance.” Rotary motion is communicated

to two strong shafts, one over and the other under the mould table. The upper shaft carries two eccentrics or cams, which work two pistons that enter the moulds from above, one for compressing, the other for ejecting the brick; the under shaft works one compressing piston in a similar way, which enters the mould from below at the same moment that the other one enters it from above. The lower shaft also carries a "partially toothed bevill-pinion," which takes into a large toothed wheel on the axis of the table, and so communicates thereto the intermittent motion required. A catch is provided to hold the mould table in its place between the times of its being moved forward.

[Printed, 10d. Drawing.]

A.D. 1864, November 18.—N° 2879.

SNELL, WILLIAM.—(*A communication from Cyrus Chambers, junior.*)—"Improvements in that class of brick machines in which the clay is forced through a die in a continuous stream, and afterwards cut into the proper lengths to form bricks." This inventor's machine includes, "arranged" in the same horizontal line with each other, the "tempering chamber, impelling screw, and forming die," and the clay moves in a direct path through the whole. The tempering chamber is a horizontal pug mill with the hinder part of its case cylindrical, but the fore part a truncated cone. Bolted to this, and forming a prolongation of it, is a "conical case containing a conical screw." "The internal surface of this case is roughened or checkered" in order to prevent the clay revolving inside it. Within this case works a screw, large where it receives the clay from the tempering chamber, and gradually tapering to a point; thus the clay will enter the "screw case" at an "annular space," i.e., round the base of the screw, "and be delivered in a solid mass." It is preferred to have an additional thread half way round the screw, to ensure the threads filling. The "compressing die," through which this screw forces the clay, is circular at its inner face, and rectangular at its outer, but where it passes from the one shape to the other four recessed grooves are formed in it, which taper down to the square angles, "their object and effect being to crowd a greater quantity of clay into the angles of the bar of clay as it passes through the die, so as to give them greater solidity and firmness." A plain rectangular die lined with steel is bolted to the compressing

B. & T.

die. The stream of clay issuing from this is received on an endless apron supported by rollers, and "long enough to prevent the bar of clay from slipping upon it." The motion of this apron is employed to regulate exactly the speed of a fly wheel carrying a cutter on an arm, and set in motion by means of a friction wheel. The power of this friction wheel or clutch can be regulated "by means of a yielding pressure, so" as "to communicate sufficient power to the wheel to do the cutting off," but not so much as to overcome the resisting power of the bar "of clay." The cutter making one cut for each revolution of the fly wheel, and "the velocity of said fly wheel being regulated" or controlled by that of the bar of clay," it cuts bricks of exactly the same length, however the speed may vary. The knife itself is hinged to the arm which carries it, and held in place by a spring, so that if it meet any extraordinary resistance, as from a stone in the clay, it will yield. Its arm is susceptible of a slight lateral movement, and an inclined guide (the angle of which can be adjusted) causes it while making its cut to move sideways as much as is equivalent to the advance of the stream of clay. The clay is itself supported "at the line of severance by a moveable "frame," which travels forward with it while the cut is being made, and is then drawn back again by a spiral spring. The severed clay is received on a stationary plate, and being pushed across that reaches a second endless apron moving faster than any other part of the machine, which "separates the bricks by a "considerable interval, and facilitates their removal." The same principle is applicable to tiles and to drain tiles.

[Printed, 10d. Drawing.]

A.D. 1864, November 29.—N° 2972.

AXTON, GEORGE, and LEACH, JOHN.—This "invention consists in so adapting an ordinary pug-mill that the clay may "may be forced into moulds passing through or under the pug-mill, the moulds being propelled along two channels, one on "each side of the centre of the mill, by endless chains," or otherwise.

The lower blades of the pug mill are oblique, and serve to force the clay direct into the moulds. The central shaft of the pug mill itself communicates motion to the two endless chains which carry open moulds with moveable or in some cases loose bottoms

through or under the bottom of the mill. "Scrapers working " by springs or weights to accommodate themselves to any inequalities in the clay, or in case of meeting with a stone," level the contents of the moulds as they leave the pug-mill; and when the filled moulds have been moved clear of the pug-mill, "the " bricks are removed by hand, the moulds are sanded and placed " in the grooves on the opposite side," and the chain moves them once more up towards the pug-mill to be refilled. There is an arrangement for tightening the endless chains if they stretch, by moving the bearings of the spindles further apart.

[Printed, 10d. Drawing.]

A.D. 1864, December 13.—N^o 3084.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from Ferdinand Miller.*)—(*Provisional protection only.*)—"A mineral " plastic composition or paste applicable to the preservation and " ornamenting of stone, wood, iron, and generally all materials " used in construction."

Two solutions are to be applied, one after the other; the first solution is prepared by combining "a syrupy solution of silicates " of soda with a certain quantity of silica, of salts, or mineral " oxides capable of producing silicates." When this coating is dry, the inventor applies the "fixative or reactive liquid, which is " a more or less limpid solution of a salt capable of precipitating " the silicates." Metallic oxides may be added to give different colours.

[Printed, 4d. No Drawings.]

A.D. 1864, December 16.—N^o 3120.

BROWN, GEORGE.—(*Letters Patent void for want of Final Specification.*)—This invention relates to "the cylinders through which " the clay or other plastic substance passes after leaving the pug-mill, and prior to its being manufactured into pipes, tiles, " hollow bricks, or other articles," and "consists in forming the " internal surface of the cylinders" "with a series of ribs, " grooves, or projections thereon, set by preference in a spiral " form, and spaced according to the quality of the clay. This is stated by the inventor to facilitate the passing of the clay.

[Printed, 4d. No Drawings.]

1865.

A.D. 1865, January 10.—N° 77.

CHAMBERLAIN, HUMPHREY.—This “invention relates to a “peculiar construction and arrangement of machinery or apparatus for the manufacture of compressed bricks from what is known as ‘granulated clay,’ whereby two, three, or more “distinct and separate pressures are applied to the clay at each “revolution of the main shaft.”

“This machine consists of a table having one or more moulds “or chambers therein.” “The bottom of each mould is formed “by a piston.” Over the top of each mould is an upper piston made hollow, and having a second piston working within it, which the inventor calls the “panel piston,” its object being “to “form the ‘panel’ or perforations in the brick; in the latter case “it would be provided with the usual perforating pins.” Granulated clay being fed into a mould, the hollow upper piston is first brought down upon it. The bottom piston is now caused to rise and give a first compression, and “during this operation the “inner or panel piston” is caused to descend. Then the bottom piston descends till it rests on a firm bearing, and the brick and both parts of the upper piston descend with it and the final pressure is given by the upper piston; this piston is then elevated and as it rises “the bottom piston follows up and expels the compressed “brick from the mould,” falling back again to leave the mould ready for a new charge.

The movements are communicated to these different working parts from one main shaft running over the machine. The piston which forms the bottom of the mould “receives a rising and “falling motion from a pair of snail cams keyed on to the over-“head shaft.” These cams work in boxes, and the boxes are connected by rods to a crosshead immediately below the piston. The inner portion of the upper piston, which has been called the “panel piston,” is connected directly to the rod of an eccentric keyed on the main shaft between the “snail cams.” This “panel “piston” carries the outer portion of the upper piston up and down with it, but not through its entire stroke, as its rod is connected with a sliding beam that carries said piston by a “cross pin,” which works in vertical slots in the sliding beam, “so that it can

“ move to a certain extent up and down without imparting motion to the beam.”

[Printed, 10d. Drawing.]

A.D. 1865, January 26.—N° 220. (* *)

SMITH, WILLIAM.—(*Provisional protection only.*)—“ Improve-
ments in machinery for compressing coaldust and other
materials fit for burning, also clay into bricks, tiles, pipes, and
other like articles.” A cylindrical wheel, with moulds round
its periphery, rotates on a shaft. “ Each mould is fitted with a
“ sliding and hinged” and flexible lid, worked by self-acting guides
acted upon by rollers. “ The lids are open, and kept open, through
“ about one-half” “ of the cylinder’s rotation on one side, and
“ are gradually closed by rollers converging in a curved line to
“ the periphery of the cylinder on the other.” “ In the bottom of
“ each mould a piston is fitted, which presses upon the solid
“ material when compressed, and delivers the same as the cylinder
“ rotates.”

[Printed, 4d. No Drawings.]

A.D. 1865, February 1.—N° 287.

WHEELER, CHARLES ANTHONY.—This invention relates to
fixing awnings and trellis, &c., for wall-fruit trees in front of
garden walls, by means of bricks formed with a notch in them, for
the purpose of receiving a batten to which the appliances to be
fixed in front of the wall can be secured. The notch is a square
sinking “ to be formed either in a knuckle projecting from the
“ side or end of new bricks.” The “ knuckle” as shown on
the drawings is a simple square projection, and it may have the
notch on one side only, or on both sides. No methods of manu-
facture are claimed, and the inventor does not include “ a ribbed
“ brick” “ with a perfect hole therein” in his claim.

[Printed, 10d. Drawing.]

A.D. 1865, February 17.—N° 452.

HILL, RICHARD, and TUSHINGHAM, ROBERT.—“ An im-
proved preparation or treatment of clay for the manufacture of
“ bricks.” This invention consists in “ preparing or treating
“ common clay to be made into bricks by mixing it with black

“ ash waste or soap waste, or the liquor of these substances,” with a view to improve the quality of the bricks.

[Printed, 4d. No Drawings.]

A.D. 1865, February 21.—N° 480.

HOMER, CHARLES WILLIAM.—(*Provisional protection only.*)—“ Machinery for making and compressing bricks in moulds formed in revolving mould plates. A pug-mill is placed “ over and between two such plates, which receive intermittent rotary motion. The moulds are provided with “ plungers,” which are forced upwards by a toggle joint or wedge, acted upon by an “ excentric or crank, to compress the clay against a top ” “ plate, which is weighted to the desired extent ” “ by a lever and “ sliding weight.” An incline subsequently raises the plungers to expel the brick.

The pug-mill may be placed horizontally.

[Printed, 4d. No Drawings.]

A.D. 1865, March 11.—N° 686.

HIRD, JONAS, and WALKER, JOSHUA.—(*Provisional protection only.*)—“ Improved machinery or apparatus for scouring “ stones, marbles, slabs, or bricks.”

“ Within a convenient framework,” say the inventors, “ which we make rectangular, by preference, we place trams to be as “ wheels or rollers, which carry a moving table having a reciprocating motion within the framework. The moving table is “ adapted to receive heavy blocks,” “ though of course light ones may be put on if desired. Over this table we place a frame- “ work,” to which light slabs are secured. Two connecting rods are attached to this table to impart motion to it. “ The lower “ table has simply a reciprocating motion, whilst the upper one “ has a two-fold one, being moved both transversely and longitudinally by the connecting rods before named, thus obtaining “ a parabolical motion.”

[Printed, 4d. No Drawings.]

A.D. 1865, March 18.—N° 767.

SPARK, CHARLES WILLIAM, CROSS, THOMAS SPRAWSON, and ADKINS, WILLIAM.—(*Provisional protection only.*)—“ Brick “ and tile machinery.”

In this machinery the clay is beaten and forced downwards by blades fixed to a central shaft within a hopper. It passes hence into a receiver and "through a contracted outlet" to moulds on a circular table, to which intermittent motion is given. The motion of the table carries each mould after being filled under a "presser," which consolidates its contents, and then to the point where the moulded brick is expelled. "All the working parts of the machine are kept clear" "from any contact with the clay or grit." The gearing of these parts is described in the specification.

[Printed, 4d. No Drawings.]

A.D. 1865, April 3.—N° 939.

LOCKWOOD, ALFRED, and LOCKWOOD, ALFRED, Junior.—
(Provisional protection only.)

Consolidating perforated bricks after their original moulding by pressure between moulds and mandrils, which enter the perforations. The pressure may either be given by forcing mandrils of a conical section into the perforations, the moulds being "made simply to contain the bricks," or "the moulds may be similar to what have before been made and used for pressing solid bricks, the pressure being applied to the brick externally, the hollow therein, when the pressure is applied, being filled with a mandril."

[Printed, 4d. No Drawings.]

A.D. 1865, June 26.—N° 1698.

JOWETT, THOMAS LEWIS.—Making bricks "with dovetail shaped grooves or indentations on one or more of their sides or faces," with the view "to ensure a more perfect attachment of plaster, cement, or other material wherewith it is necessary or desirable they should be covered."

[Printed, 8d. Drawing.]

A.D. 1865, June 30.—N° 1737. (* *)

SCHOFIELD, WILLIAM.—"Improvements in the manufacture of gas retorts and other articles made of fire-clay, and in furnaces for burning the same, and for other purposes."

Fire-clay gas retorts are moulded or cast with a number of perforations in their sides; to be afterwards filled up by fire-clay

plugs, tightened with cement. The mouth piece is secured to the end of the retort by means of threads tapped into the clay retort while yet moist, into which set screws are afterwards adjusted. Crucibles, fire-door tiles, and other similar articles liable to be exposed to great variations of temperature are also moulded with such perforations, to be filled up or not in a like manner.

The fire-bars of boiler and other furnaces are made to rotate; they may be either round or with projections and sinkings. On each one is fixed a pinion, gearing into a worm fitted to the front of the furnace. The bars may also be turned round separately, in which case each one has a square hole for a key; or they may be made to oscillate.

— [Printed, 10d. Drawing.]

A.D. 1865, July 1.—N° 1748.

LAKE, WILLIAM ROBERT.—(*A communication from John Steele.*)

1. A mode of "pressing damp clay or other plastic material to admit of the escape of the air and moisture therefrom before the final pressure," thus rendering the moulded material more compact and drier. 2. A "method of pressing the clay for bricks, tiles, and other purposes by applying the power simultaneously from two opposite directions," in order to diminish friction and to produce a more equally moulded article. 3. Perforating the mould to allow the escape of air while it is being filled, and removing the perforated part before the pressure is applied.

The inventor does not confine himself to one apparatus, but describes as a suitable mode of carrying out his invention a horizontal brick press, in which the mould is a rectangular trunk, having pistons which approach each other from opposite sides working within it. Spurs or pins project from the faces of these pistons, but can be withdrawn when requisite. Clay is fed into the mould through an opening in its top, and fills the space between the pistons, the air in the mould being allowed to escape through openings in its bottom. The mould itself is now moved so that the mouth and the perforations are slid away from the space between the pistons, thus leaving the clay "in a wholly confined space." The pistons are next caused to approach each other. They compress the clay between them, the spurs or pins continuing to protrude into the clay "till the pressure has

"become intense," when they are drawn back, and the final pressure is then given. "The clay having become so dense as to retain its form, the perforations thus produced constitute chambers into which the air and moisture before contained in the pores of the clay escape, leaving the brick nearly dry, and of a solid and uniform texture throughout."

[Printed, 8d. Drawing.]

A.D. 1865, August 1.—N° 1991.

RANSOME, FREDERICK.—"Improvements in roofing tiles and slabs." The intention of these improved tiles is to ensure ventilation in roofs covered with them. The tiles are formed with "ribs or distance pieces which, when the tile or slab is in its place on a roof, prevent it resting directly in contact with the tile or slab beneath." At the upper edge of the tile there may be, on its under side, a flange to catch on the lath, but this may be dispensed with. About midway down a flange is formed parallel to the first, and a projection or lump at its lower end; both these serve to keep the tiles apart when laid. "To strengthen the tile or slab a longitudinal rib, running down its centre on its under side, and connecting the upper flange, the central rib and the lump at the lower end" is also formed.

By preference, these tiles are to be made of artificial stone though other materials may be used. The artificial stone is compounded of sand and pounded limestone, mixed with soluble silica or silicate of soda, and, when moulded, is hardened by watering with a saturated solution of chloride of calcium, and the hardening is completed by boiling the tile in the same solution. Glass can be introduced into these tiles when moulding them, in order that they may admit light into the space below the roof.

[Printed, 8d. Drawing.]

A.D. 1865, August 3.—N° 2015.

RANSOME, ERNEST LESLIE.—"Improvements in paints or preparations for coating surfaces," which are "especially applicable for coating" "brick, stucco, and similar surfaces." The inventor says:—"I mix with a soluble silicate a pigment such as carbonate of lead, oxide of zinc, carbonate or sulphate of baryta, or a pigment-like substance such as ground glass or stone, and I combine with the said mixture a material which decomposes

" gradually the soluble silicate and causes it to deposit an insoluble silicate. I prefer to employ lime water as the cheapest and most effectual agent for the purpose. Aluminate of soda, alum, and other substances may however be employed."

"The materials should be ground in any suitable mill" like paint, mixed with water, and "used within an hour or two of the time of mixing."

[Printed, 4d. No Drawings.]

A.D. 1865, August 9.—N° 2068.

SUMNER, JAMES WILLIAM, and SCOTT, CLEMENT AUGUSTUS.—(*Letters Patent void for want of Final Specification.*)—"The manufacture of bricks and blocks for building and other purposes."

The materials to be employed are "stones, broken bricks, sand, gravel, clinkers, chalk, or other suitable materials," mixed dry with a combination of limes, such as "Dumball, Aberthaw, or Leicester," or lime of similar qualities. When moistened and "thoroughly incorporated" this material is to be placed in "moulds with hinged or suitable sides" till set; "the sides of the moulds are then disengaged, and the bricks left to dry." "This invention also includes the use of moulds made of glass, metal, or wood."

To consolidate the brick and also form cavities in it "a plunger of wood, glass, or metal, with conical perforations," may be employed.

[Printed, 4d. No Drawings.]

A.D. 1865, August 10.—N° 2071

BLANCHARD, MARK HENRY.—"Improvements in the manufacture of terra-cotta." These improvements consist in "the employment of the several ingredients and refuse gatherings from dust-yards, slate, granite, or other similar quarries," and also "the refuse of ceramic or pottery manufactures, combined with plastic clay, alumina, alkali, chalk, and silica, and the shells of fish, for the purpose of forming a body known as terra-cotta or vitreous stone," "to be employed for building or other purposes for which terra-cotta, stoneware, and plastic clay have heretofore been employed."

[Printed, 4d. No Drawings.]

A.D. 1865, August 19.—N^o 2149.

NEWTON, WILLIAM EDWARD.—(*A communication from Egbert Cox Bradford and James Henry Renick.*)

"This invention relates to that class of brick-making machines
" in which the clay is tempered by a series of knives secured in a
" revolving shaft, and the clay is afterwards discharged on a
" grate which forms the bottom of the box in which the plunger
" moves. By the action of the plunger the clay is forced through
" the grate into the moulds which are fed to the machine through
" a lateral opening, and are brought under the grate by the action
" of a pusher working on a roller platform.

"The invention consists in a peculiar mechanism for operating
" the plunger and the gate which cuts off or opens a com-
" munication between the box for tempering the clay and the
" press box whereby very little friction is occasioned, and pro-
" vision is made for conveniently regulating the plunger according
" to the thickness of the bricks to be made." In the absence of
the inventors' drawings it is not easy to describe precisely the nature
of these mechanical contrivances. The reciprocating vertical
motion of the "plunger" and the "gate" is communicated by
suspending each of them to a toothed rack which is in gear with
a toothed segment. Each of these segments receives reciprocating
motion through a "slotted lever" having a crank working
in the slot, the two levers being centred upon the same axle.

The lever working the "gate" is rigidly connected to its
segment and so communicates to it a stroke that is always the
same. The one actuating the plunger is adjustable, it carries a
"tapering slide" which when in its lowest position entirely fills
the space between two pins on the segment and carries the
segment with it through the whole stroke of the lever. When
the slide is moved the lever makes part of its stroke each way
without bearing upon the segment and thus a shorter stroke is
communicated to the plunger.

The moulds are introduced "upon a roller platform" under
the pug-mill, and are moved forward under the grate, where they
are charged by a "pusher" which is "operated by a lever that is
" secured to one end of a rock shaft, and to this rock shaft are
" firmly secured two toothed sectors which gear with racks on
" the bottom of the pusher." The lever may be worked by hand,
but to give it self-acting motion a revolving crank is provided

which catches the end of the lever and carries it with it through part of each revolution and then releases it to fall back by its own weight.

[Printed, 10d. Drawings.]

A.D. 1865, August 29.—N° 2219.

TERRELL, HULL, and DON, THOMAS.—(*Provisional protection only.*)—"Improvements in the method of and apparatus for "treating peat and other plastic materials."

The raw material is to be prepared in a pug-mill and then conveyed through "shoots in which work feed plungers" to a moulding machine having "moulds in which work plungers or "pistons actuated by cams or other appliances." Knives are provided to "cut off the blocks" when moulded.

The invention also includes a drying apparatus consisting "of "a number of chambers placed one above the other in which "trays containing the peat are placed" and exposed to hot air; and an "improved oven" which "is provided with a fire-box or "furnace in which the fuel instead of resting on fire-bars lies on "a shelving bed. Combustion is promoted by driving into the "furnace jets of gas;" and the gases driven off, "when peat is "being dried in the kiln," "are carried through an outlet exhausting pipe or still head into a condenser to be collected and "utilized."

[Printed 4d. No Drawings.]

A.D. 1865, September 18.—N° 2378.

VENABLES, HENRY.—"The manufacture of ornamental tiles "by repeated immersion of a moulded surface in slip and the "subsequent scraping down thereof." The intended ornament is cast in moulds in which its pattern is "cut the depth and "width according to the size of ornament. In the moulds thus "formed plastic clay, mixed with any color required, is pressed," such color being "capable of bearing the action of fire." These moulds are lubricated with turpentine and "the ornament or "pattern thus produced is laid" "upon and fixed, and made to "adhere by moisture to the surface of a bat or sheet of clay" of the right size and colour and slightly more dry than the patterns.

The ornamented side of the sheet of clay "is then immersed or "dipped in a solution or mixture of plastic clay called slip;"

this is repeated till the surface of the "bat" is "about level with the original surface of the pattern." The article is now dried till "sufficiently hard," the slip is then scraped away "until the pattern or ornament is disclosed" and the whole tile "presents a smooth and level surface." The tile is then cut, baked, and polished or smoothed in the usual manner. If wished "the slip may be scraped below the ornament or pattern so as to leave the latter in relief."

[Printed, 4d. No Drawings.]

A.D. 1865, September 19.—N° 2392.

GILLESPIE, JAMES.—"Improvements in the manufacture of bricks, blocks, flue covers, and tiles, and in the machinery and apparatus employed therefor."

The first and second part of this invention consist in "the general arrangement and construction of brick-making machines," and in that "of machines for the manufacture of bricks, blocks, flue covers, and tiles from fire-clay or other materials usually employed for that purpose in a semi-dry, pulverized, or granulated state by compression from the upper and lower side of the moulds by a longitudinal rocking shaft and oscillating beam, and from which all the other principal movements necessary in such machines are derived." The moulds of this machine are open with moveable mould pistons at the bottom of each, and are formed in the top of a mould table. The main shaft above referred to is horizontal and runs below the table across the machine. It receives oscillating motion from any prime mover, and an up and a down stroke of the lever complete all the movements necessary for moulding one brick and moving the mould table round one step. Direct upward pressure is given to the brick from a cam keyed upon the shaft, and almost at the same time downward pressure is exerted by a presser attached to a strong lever which is worked through a connecting rod from another cam on the same shaft. The clay in the mould "is moistened by a small regulated quantity of water or steam." The amount of clay which enters each mould is measured by raising its piston, either by means of a plate or of a lever arrangement, to a certain height at the moment when it is filled. The discharge of the brick is effected "while the table is stationary," by a lever apparatus, of which the lever "is keyed on to the main shaft,"

and the movement of the table is communicated to it by means of a "segmental rack wheel keyed on the shaft, working in the "teeth" of a rack which carries a "strong spring pall" arranged to "take into" notches formed for the purpose on the periphery of the table.

3. The construction of the moulds by "piercing their inner sides or surfaces with very small holes opening out wide towards the back for the free egress of the air contained in the clay," and also "plates for carrying off the air from the clay and for forming the upper and lower sides of the article being formed in such moulds with numerous small holes opening out very wide on the back." These plates are used in pairs, one is dropped into the mould before the clay enters it and a second is introduced upon the top of the clay and they are removed with the brick. Partial pressure can be given by inclined planes before final compression takes place.

[Printed, 1s. Drawing.]

A.D. 1865, September 20.—N° 2398.

PORTER, WILLIAM.—"Improvements" in that class of the "machinery used in the manufacture of bricks and tiles" which works by expressing plastic materials through a moulding orifice. The clay is to be forced into a "compressing chamber" by a horizontal pair of rollers or by "some other expressing instrument." The top and bottom of the compressing chamber are fixed whilst the two sides are principally composed of or are formed by the front pair of compressing rollers." Both pairs of rollers or the front pair if the rear ones are dispensed with "are driven by power at suitable surface speed to force the plastic clay or brick earth through the moulding orifices. The moulding orifice is in advance of the pinch of the front or vertical pair of rollers;" the sides of the mouth-piece "incline towards each other and the transverse sectional area consequently becomes less and less beyond the pinch of the rollers." Each pair of rollers will have scrapers to remove the superfluous clay. The moulding orifices may "be arranged to be lubricated with water."

[Printed, 10d. Drawing.]

A.D. 1865, October 6.—N° 2571.

GERMAIX, VICTOR JEAN BAPTISTE.—"This invention consists in a process for the employment of bran, husks of corn,

" seed, raspings, shavings, and pieces of cork, ~~straw~~ and hay cut up, and other light substances for the manufacture of light porous and floating bricks, either solid or hollow; tiles of any form or dimensions," and other articles. These vegetable substances may either be mixed "with ordinary brick earth in the proportion of 50 to 75 or more per cent. of the light substances, the whole being ground and baked in a kiln;" or a mixture may be made "in the same proportions of the same substances with hydraulic lime," to be dried slowly in the air and placed under water to become hard.

[Printed, 4d. No Drawings.]

A.D. 1865, October 18.—N° 2693.

TAYLOR, JOHN, junior.—"Improvements in tiles for roofing," for which this inventor obtained a patent, dated 27 February 1861, No. 506.

1. In the flanged tiles, with edges not parallel, and used alternately as "upper" and "under tiles;" undercutting the projection at the wide end of the under tile, against which the small end of the next tile rests, and bevelling that small end, so that when in place the tiles may be held together; also adding two projections to prevent any lateral movement of the two tiles, which projections, "where the flanged sides of two tiles are laid downwards and the flat sides upwards, come against the angular heads of the nails which secure the under tiles to the battens."

2. "Making tiles with parallel flanged edges" of plastic material expressed through a die, cut into lengths, and then making alterations in their flanges, partly by cutting notches, but principally by cutting away a portion near the end of one tile of each pair, and adding a portion of flange near the end of the corresponding tile, so that when laid on a roof they may lock together as shown on the inventor's drawings. Also making "like-shaped flanged tiles with parallel edges of glass by casting it when in a melted and plastic state in moulds."

[Printed, 1s. Drawings.]

A.D. 1865, October 21.—N° 2728.

ROBERTS, ISAAC.—"Improvements in machinery for screening, tempering, and moulding clays and earths into bricks, tiles, and other articles." Clay as dry from the bed may be treated

in this mechanism, the main feature of which is "a tapering or cylindrical vessel composed of skeleton outline pieces and bars or plates," the bars being near enough together to prevent the passage of stones or roots though they permit the clay to pass. A central shaft carries vanes rotating within this vessel, the action of which is to throw the clay out between the bars. The "extraneous matters" which cannot so pass will fall or be forced down to the "bottom of the said vessel into a chamber formed thereat and will be forced out," but only at intervals. The screened clay falls outside the vessel "on a plate where there is a port or ports," admitting to the "moulding chamber." "A scraper" travelling over this plate "collects the clay or earth into the moulding chamber." From this chamber the clay is forced out through a die, or preferably through two dies at opposite sides. "To effect the said forcing out, plungers operating alternately right and left are employed," and the port or inlet for clay on the side towards which the plunger is moving is closed by a slide during each stroke.

If necessary, means more powerful than the "scraper" can be employed for forcing the clay into the clay chamber. A conical-shaped vessel with perforations may be placed round the central shaft and within the screening vessel, "for containing water or other fluid for lubricating the 'pugging' vanes or arms and tempering the clay."

[Printed, 1s. 4d. Drawings.]

A.D. 1865, November 7.—N^o 2867.

BARKER, DAVID.—(*Provisional protection only*).—"Improvements in the manufacture of bricks and artificial stone and marble." The materials suitable for forming the bricks or the other substances named are to be cemented together with a "mucilage" described in the Specification of a patent for "improvements in the manufacture of artificial fuel," No. 1842, dated 23 July 1864, and granted to this inventor. This mucilage is composed of farinaceous matter and water, or lime water, with alkali, mixed in the proportions, and with the variations or additions, stated in the Specification. The blocks of building material so formed are to be burned or dried "in any suitable manner."

[Printed, 4d. No Drawings.]

A.D. 1865, November 13.—Nº 2915.

GUTHRIE, EDWIN.—This invention consists of:—

1. "The manufacture of faced bricks for building and other uses," employing ordinary brick earth for the body of the brick, but facing "one or more sides" or ends with clay of finer "quality."

2. "Apparatus for applying the slip or facing clay to bricks by hand."

3. Machinery for making faced bricks.

In facing the bricks by hand, bricks moulded in the usual way, but not of full size, are used. They are to be partly dried, and then the side or sides to which the facing is to be applied are to be wetted. These bricks are then laid one by one on a "platform" or moulding table fitted with a "guide" to receive the brick, and a hinged rectangular frame which, being turned over "encompasses" the brick, and "forms the mould to be filled with the facing clay;" the finer clay is now applied by hand, and the face smoothed off, after which the brick is removed to be dried and burned.

For pressed bricks the facing clay may be rolled to the required thickness, and squares cut of the right size may be applied to moulded bricks, and the whole consolidated in a brick press. Machinery for moulding faced bricks is also shown and described. A die or mould with pistons at top and bottom may be used, the sheet of facing clay being fed on to the bottom piston, and the clay for the body of the brick being introduced into the mould, and the whole consolidated by pressure. Where moulding orifices are used two streams of clay may be made to issue from two such orifices, and the finer clay will form a coating on the other.

In the machine shown in the drawings the facing clay is fed out of a hopper on to a circular table, where it forms a sheet. A "moulding box" descends on to this ring or sheet of clay at intervals, and after each such descent common clay is fed into the mould from a hopper above, and the brick is consolidated by a plunger, the mould being then drawn up vertically, and the plunger after it.

After each such descent of the mould the table is moved around a step, so as to bring a fresh portion of the sheet of facing clay under the mould, and to permit the finished brick to be removed. The brick is shown as being moulded, not vertically as is usual.

but in an angular or sloping position, and consequently an angular channel being formed round the top of the circular clay table, and the sheet of facing clay received in it, the facing can be applied to one face and one end of the brick simultaneously.

[Printed, 8d. Drawing.]

A.D. 1865, November 17.—N^o 2967.

SPEYSER, LOUIS GONZAGUE.—“The manufacture of bricks “ or buildings blocks from a composition ” of which the ingredients are one portion of slacked lime pulverized, six of broken stone pulverized, or of gravel or sand, two of “heaped scoria, “ and one measure of Roman or Portland cement.” “The ashes “ and half of the scoria can be omitted by substituting for these “ substances an equal quantity of gravel, but in this case the “ cement should be increased by half a measure.” The materials are to be thoroughly mixed together with water in a barrel, which is rotated. The process of mixing is described in some detail. The lime is put in first, and one-third of the cement is kept back to be added last; and the composition is to be at once moulded into bricks or blocks under pressure. The blocks will set immediately, and may be employed to build with under water.

[Printed, 4d. No Drawings.]

A.D. 1865, December 5.—N^o 3125.

BAWDEN, PETER.—(*Provisional protection only.*)—Improvements in brick machinery, consisting in a method of finishing the bricks after they are moulded, “in order to produce a better “ surface than has hitherto been produced.” “This invention “ is applicable to the brick-making machinery patented by ” this inventor, John Williams, and Samuel Williams, 17 May 1864, No. 1247, or to other machinery. The moulds when filled pass “ under the action of a series of horizontal wedge-shaped iron “ cutters, so arranged that their points shall traverse the centres “ of the surfaces of the divisions of the tray mould, and thus “ plough off or scrape the surplus clay into or upon the surface “ of the brick itself.” The moulds continuing their traverse afterwards pass under a wooden roller having a hopper over it for sand; this sands the face of the brick, and causes the clay which the cutters had scraped off “to be firmly pressed and embodied “ into the brick with sand.”

[Printed, 4d. No Drawings.]

A.D. 1865, December 14.—N° 3242. (* *)

FAIRBURN, HENRY GEORGE.—“Machinery for compressing “and solidifying coal” and clay. A number of moulds are arranged horizontally on a long framework, in connection with a cylinder driven by power, and sliding within a moulding trunk of the same shape, is a plunger driven by the cylinder. Above the plunger are a self-acting vertical hopper and scrapers, and, parallel with and in front of it, a number of loose “intervening plates,” for “dividing the substances transversely into blocks.” are “arranged within a vertical column so as to descend by their “own gravity.” As the plunger is withdrawn the coal falls down, and in front of it the mould; on its return stroke both are forced forward. The hopper can be surcharged with steam.

[Printed, 8d. Drawing.]

A.D. 1865, December 23.—N° 3325.

NEWTON, WILLIAM EDWARD.—(*A communication from Henry Wurtz.*)—A mode “of treating or preparing glue or gelatine “so as to render it insoluble in water, and applicable to various “useful purposes,” among them to “oil proofing bricks and other “porous materials for oil tanks.” The preparation is made “by “heating the glue or gelatine in the form of a strong solution “in water, together with a strong solution of chromic acid or of “an alkaline bichromate (bichromate of potash for instance).” Various other substances or colouring matters may be added, “according to the purpose for which the preparation is to be “used.”

[Printed, 6d. No Drawings.]

1866.

A.D. 1866, January 5.—N° 40.

TAYLOR, ELIAS. — “Making building bricks impervious to “water.” This invention consists in applying “to bricks “already burnt in a kiln, and bricks to be hereafter made in the “usual manner,” and also to moulded or ornamental bricks “a “glaze on their surface with a suitable glass or enamel:” also,

where desired, in colouring such parts of bricks as are intended to be exposed, "such glazing with one or more suitable colours being burnt on during the process of burning, or passing such bricks through the necessary kiln. The said bricks before glazing can be marked with a pattern to represent paper hangings."

The compositions of six sorts of glaze are given, but the inventor does not expressly claim such compositions.

[Printed, 4d. No Drawings.]

A.D. 1866, January 13.—N° 112.

DUFRENÉ, HECTOR AUGUSTE.—(*A communication from Louis Thelohan.*)—"An improved construction of pressing machine" for bricks and similar articles, intended to secure uniformity in their thickness. The press contains a mould, open above, and of which the bottom can be raised by pressure from below; above the mould is a crosshead carrying the top of the mould, below it is a "buffer," the crosshead and buffer are both free to move vertically, and are connected together by iron rods. "The press receives continuous motion from an eccentric worked by steam or hand power," and the mould being filled, the crosshead descends, and brings down the top, which compresses the contents to the required degree; it then rises as the eccentric continues its revolution, and the "buffer" rising at the same time lifts the lower part of the mould and ejects the brick, after which the bottom of the mould "falls back of itself during the descent of the striker or buffer. The quantity of clay or brick earth exceeding that required is thrown back by the press itself by means of a hole, which may vary in its dimensions, made in one of the sides of the part of the press on which the pressure is exerted," namely of the mould.

[Printed, 6d. Drawing.]

A.D. 1866, January 13.—N° 122.

JOHNSON, CUTHBERT GREENWOOD. — Improvements in "that class of machinery for making bricks, tiles, and similar articles, in which a stream of clay is expressed from a pug-mill through a moulding die or dies, and is afterwards cut into lengths."

This inventor places "the knives or blades of the pug-mill on the same axis as that which carries the screw" which expels the clay through the die. The exit end of the casing of the pug-mill is "enlarged into a bell or enlarged mouth," "and the end of this bell or enlarged mouth is closed by a fixed plate which carries a bearing to receive the end of the shaft of the pug-mill; on one side of the bearings of this shaft is placed the moulding orifice or die, through which the clay is to be expressed." By so placing the die, "the stream of clay is not divided by the bearing of the pug mill shaft," as is the case where the die is central.

[Printed, 8d. Drawing.]

A.D. 1866, January 17.—N° 155.

CRONDACE, CHRISTOPHER JOHN, and FIELD, JOHN.—"Improvements in machinery or apparatus for manufacturing and pressing fire-bricks," also applicable to "common clay and other bricks." In this machine a main shaft, "which is driven direct by a steam engine," runs across the whole apparatus, and actuates every part of it through suitable gearing.

A pair of grinding stones on a circular bed grinds up the material, "which then falls into a receiver beneath;" it is carried up from hence to the top of a pug-mill by "an endless travelling chain of buckets." Beneath the pug-mill is a cylinder, which at its lower end is "contracted and furnished with plates which slope towards a square receiver, the bottom of which is divided, into two openings, each of the form and size of a brick." A mould table with two pairs of moulds is driven with a to-and-fro motion "by a mangle wheel and pinion," and at either side of the pug-mill is a press. The whole so arranged that "whilst one pair of moulds is" under the receiver "being filled with clay, the other pair is under the action of one or other of the presses," "and vice versa." "As each pair of bricks is successively pressed, they are elevated from the moulds, and placed upon endless travelling belts" for removal.

[Printed, 10d. Drawing.]

A.D. 1866, February 28.—N° 618.

COWDERY, GEORGE.—"A machine for making bricks by a continuous rolling process, and producing them nearly in a

"dry state, and with one indent in their beds, by great pressure." A cylinder or drum mounted on a horizontal axis has on its face "a ring or rings of brick moulds." "On the top part of this "cylinder" is placed a clay hopper "and within this hopper a "triangular cam and round feeding cylinders for filling the "moulds as they revolve." "The brick moulds as they are "filled pass without the hopper, the clay being cut off as much "as may be found necessary above them," and under a pressing roller "on which are moveable parts for obtaining flat pressure," while opposite to that roller and within the drum a second pressing roller, also acts upon their contents, "so that both beds "of the bricks are pressed at one and the same time, and the "amount of pressure is at will; the kick or indent is also given "at the same time on one bed." The further progress of the drum brings the bricks to a "triangular cam" working within the said drum, by which "the bricks are pressed out of the "moulds on to a carrying off strap." This cam and pressing roller are operated upon by a ring of cogs on the inner side of the mould cylinder, and at the back of cogs is formed "a sinking opposite each brick mould for the purpose of raising or lowering the "loose bottoms working within the brick moulds, thereby regulating the thickness of the brick." An incline draws back the bottoms of the moulds after the expulsion of the bricks. A sand sieve and sand brush are arranged to prevent adhesion of earth to the pressure barrel and the bottoms of the moulds.

[Printed, &c. Drawing.]

A.D. 1866, April 14.—N° 1057.

MURRAY, CHARLES HENRY, and JENNINGS, MATTHEW.—
"Improved machinery for kneading, compressing, moulding,
"or forming clay or other plastic substances, into bricks, tiles,
"pipes, or other useful or ornamental articles."

The clay is placed in a hopper at the bottom of which are mounted two cylinders or rollers, with either fluted or plain surfaces between which the clay passes; by these it is forced upon a second pair of "rollers or cylinders provided with very deep or "recessed grooves or flutes working in a close clay chamber. These rollers rotate "in a direction opposite to that of the top "pair of rollers." The flutes of the lower pair of rollers "gear "into each other, so that as the rollers rotate the clay may be

"forced out of the flutes or grooves into the space below the rollers and communicating with the exit channels," of which one or two may be provided at pleasure. The exit channels have moulding dies at their openings, and where two channels exist, valves resembling the dampers of a flue, are introduced which are alternately opened and closed so as to make the clay "issue first from one and then from the other channel." The nozzles or dies are to be lined with flannel or cloth, and oil or water is to be supplied to this lining from an "internal space or channel," provided for the purpose. A "rising and falling bar of triangular section is provided to press the clay down," to the bite of the upper pair of rollers; also scrapers to remove superfluous clay from them. "The clay as it is delivered from the nozzle may be divided by any convenient mechanism."

[Printed, 10d. Drawing.]

A.D. 1866, April 27.—N^o 1194.

DIXCEE, THOMAS. — This invention refers to that class of machines where clay is expressed through a die or moulding orifice, and subsequently cut into lengths. It consists in "arranging apparatus in such a manner that the stream of clay or material from an expressing machine may, while it is being divided into lengths be supported, and held tight laterally, by supports which afterwards retire to allow of the forward flow of the clay or material." For this purpose two sets of "movable lateral supports" are provided, one set on each side of the stream of clay, and as many of them in each set or series "as there are bricks cut off at each operation of the cutting wires." Each support is nearly of the width of the brick or other article and they are so arranged that "between each support and the one near it there is just sufficient space for the passage of a cutting wire." "The cutting wires are fixed in a frame" and are caused to pass, frame and all, from side to side of the machine each time a cut is to be made. The movement of this frame acts upon levers arranged for the purpose of moving forward the supports on either side: till they bear upon the stream of clay; "this takes place immediately before the wires commence to cut, and immediately the wires have passed through the clay" the levers are released, and being weighted, "fall down and the supports move" "away from the bricks or articles."

[Printed, 10d. Drawing.]

A.D. 1866, May 12.—Nº 1365. (* *)

PRICE, ASTLEY PASTON.—(*A communication from Jakob Bühner and Carl Hamel.*)—"Improvements in the means of affecting the "combustion of fuel and in apparatus employed therein." They relate to the process described in Specification, No. 956, A.D. 1866, and consists in using an exhaust or blowing fan and a self-acting arrangement for feeding in the finely powdered fuel. The air blowing or exhausting apparatus is preferably driven by the same prime mover. This system of combustion is applicable to steam boilers, and also to the burning of bricks, lime, cement, pottery, and similar goods, in which latter case the materials to be burnt may be so stacked as to themselves form the combustion chamber for the powdered fuel. The self-acting feeder for supplying the powdered fuel consists of a conical hopper, fitted with a conical plug, to the upper end of which is attached an open cage. "A vertical spindle is attached to the conical plug, and passes "through a collar bearing on the mouth of the hopper, an adjustable collar as the spindle serving to regulate the height of the "plug and consequently the size of the feed orifice." "A horizontal lever arm is attached to the upper end of the spindle, "and to this arm is connected a reciprocating rod" worked by the prime mover. A number of such hoppers worked simultaneously in this way are employed. Instead of conical plugs "rotary cocks, valves, or regulators, or reciprocating slides" may be also adapted to two hoppers; but in all cases the fuel is fed in in concert with the apparatus for supplying the air supporting combustion. This air is preferably heated by means of the waste heat of the combustion chamber or the furnace or flues.

A pottery kiln is shown with a long deep combustion chamber, into which the powdered fuel is fed from a self-acting hopper, and which is supplied with heated air through perforations in a hot-air flue lying parallel to it.

For brick, lime, or cement kilns the materials being so stacked as to leave interstices for the descent of the powdered fuel, a number of feeding hoppers are disposed along the top of the kiln. The plugs on either side are simultaneously acted upon by one long rod connected to a number of levers by means of pins.

A steam boiler is shewn with its lower portion contained in a combustion chamber communicating by passages with a lower

combustion chamber. Incline passages lead from the self-acting feeding hoppers to the lower portions of the vertical passages communicating with the upper combustion chamber and also leading to the lower combustion chamber. Lateral flues branch off from each side of the upper part of the upper combustion chamber and open into longitudinal flues running alongside the boiler. From the bottoms of these flues other perpendicular flues descend to wide passages below, which after uniting in one flue, may be made to communicate with a pair of Siemens' regenerators. The plugs of the hopper are worked as already described, and from its shafting is driven a fan blower or exhauster for causing a draught through the combustion chambers. The furnace is started by lighting a fire in the lower combustion chamber; the powdered fuel is then fed in by the hoppers down the inclined passage; it gets ignited, and the gases are carried up the vertical passages into the upper combustion chamber, where they impinge against the bottom of the boiler, the others are removed from the lower combustion chamber through closed apertures specially provided for the purpose.

[Printed, &c. Drawing.]

A.D. 1866, May 16.—N° 1389.

CURRY, WILLIAM.—Improved machinery for the moulding of bricks and tiles. In this machinery a clay table is provided, to which are secured two fixed "abutment plates" facing each other, each of the dimensions of one end of a brick. Two "sliding pieces" of similar shape are provided, which work to and fro "within a sliding box which is constructed to form two "ends and one side" of a brick mould, "the other three sides "being formed by the end of the table, the table itself, and the "second sliding piece, respectively." A quadrant, worked by a lever, is fixed below the table and is connected to the slide by steel bands "so that when the quadrant or wheel is turned this "slide is caused to move backwards and forwards from either end "of the table." In moulding bricks with this machine a piece of "clay is placed in front of one of the abutment plates, and then the lever being worked, the "sliding piece" and sliding box come forward and mould the brick. The same process is gone through at the opposite side of the machine and a second brick is moulded leaving the first free to be removed, the sliding piece being drawn back from it as well as the box.

This machinery may be adapted to forming perforated bricks by mounting a series of tubes for forming the hollows on a frame working inside the sliding box, and moved from side to side in the same manner by the aid of a second quadrant, but receiving motion from the same lever. This machinery may be worked by power, and a series of boxes side by side may be made use of.

[Printed, 10d. Drawing.]

A.D. 1866, June 6.—N° 1563.

RIGHETTI, PETER.—A kiln for generating heat, to be employed in the burning of bricks, or for other purposes. This kiln is a vertical, tapering chamber, strongly built with fire resisting materials; it is to be smallest near the bottom, where it has fire-bars, and vaulted above, with an opening in the vault. Below the vault, but at the top of the kiln, lateral passages branch off, along which the heat is conveyed to the chamber in which the bricks or other articles to be burned are placed. This kiln is charged with fuel broken small, and limestone in alternate layers, and lighted from below. When the heat is lowering a portion of its contents are to be withdrawn from below by removing some of the bars, and additional fuel and limestone introduced above. The lime can be separated from the cinders, and "the price of the lime covers the expense of the combustibles." Where limestone is not wanted to be burned "it could be replaced by pieces of fire-bricks serving to separate the pulverized combustibles."

[Printed, 6d. Drawing.]

A.D. 1866, June 7.—N° 1568.

SELLARS, JOHN CARRINGTON. — (*Provisional protection not allowed.*)—Burning gas coke, cinders, or other residuum from the "distillation of coal, cannel, shale, or other compounds." "The substance or powder thus produced" to be employed, among other purposes, "as a material for making tiles or bricks or other plastic forms."

[Printed, 4d. No Drawings.]

A.D. 1866, June 8.—N° 1581.

MURRAY, CHARLES HENRY.—"This invention of improvements in machinery for making bricks" relates to cutting a stream of moulded clay into bricks. "Supposing a quantity of

" clay of the proper sectional area and sufficient length to form
 " say twelve bricks has been expressed from the kneading machine
 " and delivered on to the table of " this machine, it is cut off by
 " a wire mounted in a frame and moving in guides. " The proper
 " length of clay having been thus cut off, the lump is next
 " pushed forward against a series of fixed wires, whereby it is
 " divided up into bricks of the usual and proper dimensions.
 " This pushing forward of the lump of clay is effected by means
 " of a second moveable frame or table, to which is adapted a
 " series of separate blocks or pistons, which as they advance
 " push forward the clay against and past the fixed wires. This
 " advance of the clay is effected by means of a hand lever or by
 " means of a rack-and-pinion motion, which is acted upon by a
 " winch handle or a hand wheel."

[Printed, &c. Drawing.]

A.D. 1866, June 22.—N° 1663. (* *)

HENRY, CHARLES PHILIPPE.—(*Provisional protection only.*)—
 " Improvements in paving roads, streets, yards, or other similar
 " ways or surfaces."

This invention consists " in making use, as a substitute for the
 " ordinary paving or flagstones hitherto employed for such pur-
 " poses, of moulded blocks of glass, in such manner that all the
 " blocks being of the same size and shape (by preference that of
 " a cube) apply themselves closely against and serve as mutual
 " support for each other, whilst in order to cause the blocks
 " closely to adhere together and form as it were one regular body,
 " those sides of the blocks which are to rest against one another
 " are moulded with a rough surface, or provided with small
 " recesses and projecting parts, which make the blocks fully
 " dependent on each other."

[Printed, &c. No Drawings.]

A.D. 1866, June 27.—N° 1712.

FYFE, WILLIAM HOLBORNE.—(*A communication from Robert London Walker.*)—Improved brick-making apparatus. A pug-mill, with the shaft fixed vertically, prepares the clay and forces it downwards. A box or chamber passes through the bottom of the pug-mill, having in its top two openings as inlets for the clay; and its two ends prolonged into two "mouth-pieces,"

slightly tapered and terminating in moulding orifices, which, when bricks are being moulded, are rectangular and "fitted with brass moulding rollers, one to each side, and all by preference connected by bevil wheels and driven simultaneously." The box which passes through the pug-mill is of uniform area, and the middle of it is occupied by a "slide block having a piston at either end. This block receives reciprocating motion, but no air is allowed to enter in front of the pistons, which are packed by means of rubber or other suitable material;" "and as either piston recedes inward from its respective outlet, the clay is as it were thereby sucked down in front of it through" one of the inlet openings already described, "whilst on the piston again moving outwards the clay is forced into the outlet" and through the moulding mouth-piece. "The clay issues in a stream from each outlet mouth, and each stream is cut into bricks by any common arrangement of wires or knives, which are made to act at the period when the stream is stationary."

[Printed, 8d. Drawing.]

A.D. 1866, June 29.—N^o 1739.

JOHNSON, JOHN HENRY.—(*A communication from Isaac Gregg.*)

—"This invention relates partly to certain improvements in the brickmaking machine for which letters patent were granted to George Haseltine" 8 July 1863, No. 1692, and refers to "that class of machines wherein bricks are made from untempered clay." It relates also to "machinery or apparatus for controlling, or stopping, or starting brickmaking machines."

In the machine shown and described in great detail by this inventor, clay is fed from a hopper on to a mould plate containing two sets of moulds, each mould being open above and with a moveable piston below. The table receives a reciprocating motion and the bricks are delivered alternately at either side of the machine, being forced upwards by the raising of the piston and then swept off the table by the advance of a box which contains a lubricator.

The inventor claims:—1. His "mode of controlling, stopping, and starting the machine." Motion is communicated from a pulley on the main driving shaft to the machine through a belt which is long enough to hang loose over the said driving shaft, and the machinery is started by an arrangement which brings a

roller to press upon this belt till it bears on the pulley, and is stopped by withdrawing that pressure.

2. Changing the direction of the current of clay as it descends the hopper from outside to the other as the moulds move to and fro "by means of a moving partition" within the hopper.

3. "Starting the pistons or followers of the moulds together "with their contained bricks by means of inclined planes," over which they are carried during the traverse of the mould table. This is done to relieve the "lifters" from undue strain; for the subsequent raising of the pistons to the surface is effected by the "lifters" which form part of Haseltine's patent before referred to.

4. So arranging the flanges at the end of the mould pistons that the pistons will be elevated when travelling over that one set of inclines intended to act on them, but will remain depressed while passing over the incline intended to act on the other set of pistons; this is accomplished by recessing the inclined plane and putting a corresponding flange on the piston.

5. The use of wheels with a recessed periphery to act in the same way as the inclined plane, above referred to, in giving an upward motion to the pistons of the brick moulds.

6. The use of a revolving brush "to clear the upper surface of "the pistons from superfluous clay;" and 7, combining this brush and a revolving oiler in the same box.

8. "Imparting an alternating motion to the two lubricators and "sweepers by means of the divided shaft and the mechanism" connected therewith, as described in detail in the Specification and shown on the drawings.

[Printed, 1s. 4d. Drawing.]

A.D. 1866, July 2.—N^o 1754.

BONNEVILLE, HENRI ANDRIEN.—(*A communication from Maurice Abord.*)—This invention consists in "the general making and arrangement of hollow bricks for the construction of "ceilings in houses." These bricks are so formed as to fill the space between two floor joists and to overlap about half of the underside of each joist, so that the adjoining bricks will nearly meet below the joists, and they are supported in their place by a projection formed at each end of the brick, and intended to rest upon a fillet to be fixed to the side of the floor joist. The under surface of these bricks may be roughened so as to furnish a key

for the plaster to take hold upon, or the bricks may be made of superior material and their face "varnished and decorated" to form a ceiling. They are perforated in any way found most advantageous for lightness and strength, and their dimensions are optional.

[Printed, 8d. Drawings.]

A.D. 1866, July 3.—No 1768.

ALLEMAND, ALEXANDRE PIERRE JOSEPH, and SPEYSER, LOUIS GONZAGUE.—(*Provisional protection only.*)—Machinery for making bricks, applicable to blocks, tiles, artificial fuel, and other purposes. The material is fed into a hopper, and the moulds which have moveable bottoms and are "formed on trucks or carriages linked or connected together so as to form an endless chain," first pass under this hopper to be filled. The further progress of the moulds brings them under a compressing roller and subsequently under knives or scrapers. The bottoms of the moulds are next, "pressed upwards, whilst at the same time the moulds pass under another roller" to polish "the upper surface of the materials." "After the moulds have been carried past the polishing roller, the piston," which forms the bottom "of each mould is, by inclines, caused to rise further" till the bricks can be removed by hand, after which the moulds pass back to be refilled.

[Printed, 4d. No Drawings.]

A.D. 1866, July 4.—No 1770.

NICHOLS, DAVID, and LEACHMAN, WILLIAM BRADSHAW.—Machinery for moulding and pressing bricks. The mould in this machine has its ends fixed, it is open above, one of its sides is formed by a die, and the other by a slide or door. The clay is forced from above down into it by a pair of rollers, or preferably by "a metal presser," which has a "reciprocating vertical movement" imparted to it. "Sufficient clay having entered for the formation of a brick" a knife is caused to advance which works horizontally. This "knife cuts off or separates the clay in the mould from that which is in the space" above it, and remaining during the compression of the brick forms the top of the mould. The die, which forms one side of the mould, is now caused to advance under the knife till the brick is thoroughly consolidated,

and then the sliding door which forms the opposite side of the mould is opened, "and the die pushes the brick out."

The movements of the clay "presser," the knife, the die, and the door for discharging the brick are all obtained from cams on the main shaft, partly through direct connecting rods and partly through cranked levers, but the inventors do not confine themselves to the precise mechanical details shown by them.

[Printed, 10d. Drawing.]

A.D. 1866, July 7.—N^o 1794. (* *)

KUNSTMANN, ROBERT.—(*Provisional protection only.*)—"Improvements in burning and drying bricks, pottery, earthenware, clay, lime, and cement, and in the apparatus employed therein." They relate to constructing kilns for burning in a continuous manner bricks, pottery, earthenware, clay, lime, cement, &c., and also to drying bricks previous to their being burnt.

The kiln consists of chambers communicating with each other and with a chimney by flues, having dampers for determining the communications. Each chamber is heated by fire-places situated in the sides.

The grate is composed of parallel bars arranged in the form of steps, forming a stepped fuel surface. The exterior of each grate is closed by hinged doors, one of which is opened when supplying fuel, and the others for clearing the bars. In the bottom of each chamber are perforations communicating with a flue beneath, which communicates with the adjoining chamber. It has also a branch leading from it to the fire-places, either of which communications may be opened or closed by dampers. Openings in the roof communicate with flues which lead direct to the chimney. When a number of chambers are employed they are constructed in two parallel rows, with a tramway between them, and preferably with the doors of each row opposite each other, or the fire-places in each row may be opposite each other, and the kiln doors on the outer sides. In using these kilns the hot air is taken from that chamber in which the bricks are cooling. It is caused to pass by the bottom flue through the fire-place of the adjoining chamber. From the chamber in which the bricks are burnt the air passes downwards through the bottom into the flue beneath, and is conveyed into the next adjoining chamber through the openings in the floor. These last chambers communicate with the chimney

by the openings in the roof and the flues above them. "By the time the bricks in the first-mentioned chamber have been sufficiently cooled to be removed, the bricks in the next one are burnt, and the first chamber may be refilled whilst the hot air from the second passes through the fire-grate of the third kiln or chamber, and so on throughout the series, the process being continuous."

[Printed, 4d. No Drawings.]

A.D. 1866, July 18.—N^o 1871.

BARKER, DAVID.—(*Provisional protection only.*)—This invention relates to machinery for forming blocks of artificial fuel, but is available also for the moulding of "various plastic materials."

The machine consists of a vertical pug-mill having "a tube of rectangular section" placed horizontally below it "and extending on each side of and beyond the same." To the lower end of the pug-mill shaft "a circular disk is attached eccentrically," which works within a rectangular box, "fitting the interior of the horizontal tube but free to move therein." When the pug-mill shaft rotates the eccentric disk moves this box to and fro, so as to propel "the materials through the tube towards its respective extremities, the entrance of such materials into the respective portions of the tube being alternately permitted and prevented by the motion of the box." Cutters near each end of the tube divide the moulded material into blocks in the usual manner.

[Printed, 4d. No Drawings.]

A.D. 1866, August 14.—N^o 2081.

PAGE, EDWARD.—(*Provisional protection only.*)—Brick machinery, in which the moulds are "caused to travel immediately under the mill," i.e., pug-mill, "so as to receive the clay direct from it, and by preference in two rows." The axis of the mill is provided at its "lower end with a plate which is affixed to and revolves with this axis." "This plate, except at an opening where the clay is forced through it, serves as the bottom to the mill and also as a cover to the moulds passing under it." At one edge of this opening a blade is formed to force clay into the moulds beneath, "and then such clay is cut off and smoothed on the dies or moulds by the bottom surface of the plate." The

moulds are to be supplied and removed either by hand or by mechanical means.

[Printed, 4d. No Drawings.]

A.D. 1866, August 14.—N° 2084.

BAXTER, CHARLES FRANCIS.—(*Provisional protection only.*)—
“ The application of paraffin to the waterproofing and preserving
“ various materials, including terra-cotta, stucco, brick, and like
“ substances, by filling up their pores therewith.”

[Printed, 4d. No Drawings.]

A.D. 1866, August 25.—N° 2195.

POLLOCK, JULIUS FREDERICK MOORE.—“ Improvements in
“ machinery for pressing bricks, tiles, corbels, or other plastic
“ work.” It is intended to operate upon bricks, &c. which have
already been moulded, and “ there are three modifications of this
“ machine.” In the first the bricks are fed on to a self-acting
slide, which moves them forward one by one on to a table, in the
centre of which is a die or mould. The brick is received between
two “ pressing plates ” and caused to descend into the mould,
where it is consolidated by pressure from above ; it is then raised
again to the level of the table, and the next brick in advancing,
pushes it off from the lower pressing plate on to an endless chain,
which removes it. Self-acting lubricators may be added. The
pressure is derived from the intermittent action of the piston of
a steam cylinder ; the other motions, which are continuous, are
derived from the uncoiling of a spring “ compressing air, raising
“ a weight,” or from any other available mode of storing force.
Each up stroke of the steam piston winds up the spring, and as
it uncoils it sets in motion, through suitable gearing, the self-acting
slide and the endless chain, which receive and remove the bricks ;
also the two steam valves, which actuate the steam piston by
admitting the steam first below and then above it. A consolidated
brick is thus removed by each up stroke, and a fresh one is
consolidated at each down stroke.

In the second modification of this machine a small separate
steam engine takes the place of the spring, and in the third
modification a strap from any kind of shafting already in use, or
hand power, is employed to actuate the movements of those parts
of the machine which the spring acts upon.

B. & T.

The inventor claims, 1. "The external arrangement and self-contained nature of the machine." 2. "The employment of a spring or other maintaining power or accumulated force, and the connection by that means of the continuous and intermittent motions." 3. "The arrangement of the cylinder and valve gearing;" also crossheads above and below the brick mould through which the pressure is exerted on the brick. 4. The gearing and other "means employed for obtaining all the self-acting motions from one shaft." 5. "The independent action of the cylinder and other parts of the machine being such that very small driving power is required."

[Printed, 1s. 10d. Drawings.]

A.D. 1866, August 29.—N° 2230.

DAVIS, JAMES.—This invention relates partly to purifying water, but the third part of it relates to artistic castings, to cement for building purposes, and to "rendering wood, stone, brick, tile, and other porous materials used in buildings of every kind impervious to water, as also indestructible to the natural elements."

This part of the invention is carried out by placing the bricks or other substances in "an air-tight gas chamber or tank about half filled with water," in which is placed "caustic lime in the proportion of about half a bushel to every hogshead of the water, together with or without the caustic alkalies, soda or potash, or one of them," and "with or without one or more of the silicious, aluminous, or ferruginous substances." To this is connected a retort in which limestone is subjected to the action of fire, so as to drive off its carbonic acid gas. Under the influence of this gas the bricks or other porous building materials become saturated, and when the tank is opened "congelation" and crystallization "of the soluble substances" takes place on the pores of the building material and protects them.

[Printed, 4d. No Drawings.]

A.D. 1866, September 10.—N° 2323.

GEDGE, WILLIAM EDWARD.—(*A communication from Alfred François Osselin.*)—(*Provisional protection only.*)—"Calcareous bricks or artificial stone," which may be of any dimensions and are made of "lime and sand with the addition of the detritus

"or waste of other materials such as stone or brick." They may be manufactured in two ways. First under centrifugal force: "a horizontal bed or plate is encompassed with moulds open on the side towards the centre of this plate and closed on the opposite face by a door." The materials are thrown onto the plate, which receives rapid rotary motion, the resulting centrifugal force causes the material to enter the moulds and it there becomes moulded. In the second mode of manufacture two "series of moulds filled with the matter of which the brick or stone is to be made" are hung from a swinging lever and are by hand alternately lifted and allowed to fall sharply upon a fixed bed plate. This action is intended to compress the matter "by reiterated shocks."

These bricks may be set in a layer of wet sand which will form mortar with the lime "which exudes or sweats from the bricks."

[Printed, 4d. No Drawings.]

A.D. 1866, September 17.—N^o 2386.

JOHNSON, JOHN HENRY.—(*A communication from François Durand.*)—"This invention relates to a peculiar arrangement and combination of mechanism for moulding and compressing "bricks, tiles, &c." In this machine clay is thrown, or dug, into a hopper and its weight is relied on to convey it into a box or mould below the hopper. "A horizontal compression is imparted to the material by means of a sliding piston which fills the box and is actuated by a crank and connecting rod." The brick being sufficiently compressed between this piston and the end of the box, the said end is then caused to recede, preserving its vertical position, and the piston continuing to advance the brick is removed by it from the mould. An endless band is provided to receive and carry away the bricks one by one upon loose "tablets" which are dropped on to the surface and carried forward by projections placed there for the purpose. A level pallet rises under the endless band at the moment that each brick is released and lifts the surface of the band so that it may take the brick easily. Arrangements for perforating the bricks may be added if desired.

The connecting rods which work the sliding piston also move forward the end of the mould box at the latter portion of each forward stroke of that piston, after which it is drawn back to its

place by the action of a cam keyed on to the main shaft and connected to it by rods, and retained there till the piston again advancing has compressed the next brick.

[Printed, 10*d*. Drawings.]

A.D. 1866, September 24.—N^o 2453.

KUNTSMANN, ROBERT.—This invention relates to “drying bricks or other articles,” 1, “by means of currents of air mixed, regulated, and distributed in a chamber wherein a partial vacuum is maintained;” and, 2, “by currents of air or steam in a chamber wherein a slight pressure is maintained.”

In the first mode of procedure a “fan or other suitable exhauster extracts air at one end of the chamber,” and a current of air is admitted “through a finely perforated plate or wire gauze at the other end,” but “the area of the perforations for the incoming air should be less than that of the perforations or outlet for the outgoing air; so that a slight vacuum or diminution of pressure may be maintained inside the drying chamber.” The temperature of the air admitted is to be carefully regulated by mixing hot and cold air together in the tubes which conduct to the inlet.

“According to another system of drying I propose to admit superheated or dry steam into the drying chamber and to maintain a slight excess of pressure therein above that of the atmosphere;” or “dry air of the required temperature may be employed and maintained at a slight pressure.”

[Printed, 8*d*. Drawing.]

A.D. 1866, October 8.—N^o 2594.

BOUSFIELD, GEORGE TOMLINSON.—(*A communication from Antoine McNair.*)—Machinery for manufacturing bricks with great rapidity. In this machinery the material is prepared in a pug-mill called by the inventor a “mortar box” fixed horizontally. It is here acted upon by knives of a triangular section. Beneath this box works a “sliding board” which moving backward and forward drives the moulds (which are arranged in a pile in front of the mortar box) one by one, and sideways, under the said box. Here they are filled with the material by the action of another sliding board and then pass on to a “presser” which, working

vertically up and down, presses the bricks; they are then ready for removal.

[Printed, 8d. Drawing.]

A.D. 1866, October 23.—N° 2736.

WETHERED, GEORGE.—(*Provisional protection only.*)—"Apparatus for washing clay" chalk, and other materials for the use of brickmakers. "A pit, of any given length, and semicircular in section," having mounted over it "a long horizontal shaft armed with radial blades or beaters set helically round the shaft." The materials, with water, are fed into this pit, and "the rotation of the blades or beaters will produce a thorough trituration of the clay and chalk by the time the material has reached the discharging sluice."

[Printed, 4d. No Drawings.]

A.D. 1866, November 12.—N° 2950.

PIDDING, WILLIAM.—(*Provisional protection only.*)—"This invention comprises improvements in the manufacture and formation of hollow or cellular bricks of any shape or size from clay" or any other material, "such bricks being strengthened by internal stays, ribs, or cores, running entirely or partially through their interior." "The external and internal portions," when dried and burned, "becoming united or one body."

Also making bricks "from fusible matters," and from materials "which are capable of being reduced to a pulp."

[Printed, 4d. No Drawings.]

A.D. 1866, December 5.—N° 3200.

TOWARD, JOHN.—Machinery for moulding bricks. In this machinery the moulds are recesses on the periphery of a drum or cylinder, and the pistons which form the bottoms of opposite moulds are connected together, and are at such a distance apart, that when one mould is fully open to receive clay from outside, the bottom of the corresponding mould is elevated to its mouth. The clay is fed into the moulds from a pug-mill furnished with a "wiper" at its outlet and the cylinder receives intermittent rotary motion "by means of a pawl and ratchet wheel." After mould has been filled "the following action of the pawl brings a

"fresh recess" or mould "opposite the opening" of the pug mill, "and passes the recess already filled under a press where the clay is consolidated." The pistons are caused to advance and recede by the action of "a fixed bearing," i.e., an axle passing through the bearings of the cylinder, which are hollow, but out of centre with the cylinder "by at least half the thickness of a brick;" the connecting bar between each pair of pistons "being provided with a suitable slot to take the eccentric bearing already referred to in such manner as to receive motion therefrom, and to cause the recess on one side the wheel to be of the size required to mould the brick, whilst the bottom of the recess immediately opposite pushes the already formed brick on to a moveable or other platform" to be taken away.

[Printed, 8d. Drawing.]

A.D. 1866, December 22.—N^o 3376.

GOODFELLOW, HENRY.—This invention relates to the preparation of materials for the manufacture of bricks; and consists, 1, in "improved machinery and apparatus for grinding clay and strong marls;" and, 2, in the combination of a machine or apparatus for grinding clay with an ordinary pug-mill."

The grinding machinery consists of a central upright shaft carrying a "runner" or grinder of the shape of a frustum of a cone, and "having cast upon it certain ribs or projections which are placed in an oblique direction. The said cone-shaped runner works within a strong metal casing of suitable shape and size, which is provided internally with certain other ribs or projections." The marl is ground between the casing and the runner," and is worked downwards to the bottom of the cone; from here it falls into the pug-mill underneath, the arms of which are fixed on the lower part of the same vertical shaft which carries the "runner" of the grinding machinery.

A recess, which can be opened at pleasure, is formed in the casing, and here any stones or other foreign substances which may be in the marl accumulate, and can be removed from time to time.

[Printed, 10d. Drawings.]

APPENDIX.

A.D. 1840, June 17.—N° 8548.

PROSSER, RICHARD.—The nature of this invention is described by the inventor as follows:—"Firstly, the manufacturing of " buttons, knobs, rings, and generally all or most of the other " articles which have been or can be made from any of the materials used in the manufacturing of earthenware and porcelain " by means of the improvements in manufacturing " introduced by this inventor; " of which improvements the distinguishing " features are that the said materials are used in a state of powder, and manufactured by pressure between hard surfaces; either " plain or figured, into solid articles, without any water being " used in the course of the said process (except in so far as water " may be requisite in grinding them into powder) and which improvements in manufacturing I call the dry process of pottery " and brickmaking." A press is shown in which the dry and pulverized materials are moulded under considerable pressure; and, if desired, an ornament in relief may be impressed on the articles while being moulded. After leaving the press the articles are ready for burning.

2. A peculiar form of button.

To this Specification is appended a Disclaimer, in consequence of which the claim for the second part of this invention is limited to the articles when made of the materials, and according to the improved methods which form the subject of the first part.

[Printed, &c. Drawings.]

A.D. 1855, February 15.—N° 346.

DELABARRE, CHRISTOPHE FRANÇOIS.—"Apparatus to be " used in propelling gases and forcing liquids." This invention is a form of steam-blast, and is described by the patentee as "the " use and employment of a mixture of steam and air or other " gases, instead of the apparatus now in use for the same pur-

"pose." This mixture is effected "by projecting a relatively small and more or less condensed current of steam or other attracting fluid into a large single or multiple recipient pipe or channel, so as to give access to and cause the attraction of a considerable mass of air to be carried along with the steam" for the purposes of 1, causing draught in furnaces, including brick kilns; 2, "heating or warming houses, water, &c.;" 3, "exhausting or extracting vapours."

The inventor explains at great length that a steam jet assumes the form of a cone, and that by throwing a jet of steam centrally into a tube, properly proportioned to the dimensions of such cone, a large quantity of air may be carried forward with the steam, and that this quantity may be increased by employing several tubes of increasing diameters one beyond the other. He produces draught in furnaces either by causing the steam-jet apparatus to throw air into the furnace, or by using it to attract the products of combustion out of it. In applying these improved modes to the burning of bricks, it is stated to be important that the steam and air should form "a mixed globular or vesicular gas." This will not occur when the air is very hot, "and hence it is necessary to absorb the excess of temperature;" a mode of accomplishing this is shewn and briefly described as follows:—"In this arrangement the attracting apparatus is not adapted immediately to the sides of the furnace, but follows a single channel or set of pipes immersed in a long trough, which is constantly traversed by a current of water."

[Printed, 1s. 2d. Drawings.]

A.D. 1859, November 25.—N^o 2668. (* *)

CARR, THOMAS.—"Improvements in the arrangements and mechanism for drying glue, moulded clay, sugar, white lead, and various other substances and articles of manufacture." These are, first, "the combination of a fan or series of fans" constructed on the following principle, "with a chamber or chambers for drying purposes." A long square chamber is constructed, "open at each end, in which the materials to be dried are placed with suitable intervals between them for the free passage of the air." "On a horizontal axle a fan consisting of two or more radiating arms or blades, set at right angles with their plane of rotation, and very similar in form and construction to the

"sails or vanes of the ordinary windmill," is placed. This fan rotates by any convenient motive power in a circle "equal or nearly so to the breadth or depth of the square chamber opposite to the end of which the face of the fan is placed." "When the chamber is so long, and the obstructions of the air considerable," "another or more similar fans" are made use of "to maintain the current, which may be mounted at regular distances down the chamber on the same axis as that of the first, lengthened for the purpose."

Second. "The system or method of drying articles or substances in chambers by causing the major part of a current of air artificially heated and set in motion by mechanical means to keep continuously circulating through the said chambers," as follows:—By adding one or more chambers "placed alongside the former and communicating with it at both ends," and causing the currents of air generated by any mechanical means, but preferring the fan as above, to "pass up one chamber and return down the other in constant circulation, until the temperature is raised by its frequently passing over any suitable heating apparatus placed within the chambers." There are dampers and valves "in order to regulate the temperature and change the air."

[Printed, *3d*. Drawing.]

A.D. 1860, October 20.—N° 2562.

GRIMSHAW, WESTON.—This inventor claims, "the use of an Archimedian screw surrounded by a heated jacket for the purpose of drying, mixing, and pulverizing clay and other materials." The blade of the screw may be "either plane, or serrated, or furnished with projections for the purpose of mixing and pulverizing the clay;" the screw revolves in a long cylindrical case, and its axis is supported at intervals. Opposite these intervals the blade of the screw is cut away. There is an outer jacket surrounding the case, and steam may be admitted between the two, or heat applied in some other manner. "The apparatus may be placed horizontally or at an angle."

[Printed, *6d*. Drawing.]

INDEX OF SUBJECT MATTER.

[The numbers refer to those pages in which the Abridgments commence.
The names printed in *Italic* are those of the persons by whom the
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ERRATA IN PART I.

Since the publication of the first volume of the present series of abridgments the following errata have been discovered therein.

Page 1, line 1, *for* "January 28" *read* "January 12."

Page 3, line 10, *for* "Baughe" *read* "Baugh."

Page 4, line 19, *for* "July 15" *read* "May 9."

Page 6, line 15, *for* "April 5" *read* "January 23."

Page 8, line 10, *for* "Sandford" *read* "Sanford."

Page 19, line 2, *for* "Lee" *read* "Lees."

Page 20, line 31, *for* "Stanniford" *read* "Stainford"

Page 37, line 23, *for* "August 13" *read* "August 8."

Page 59, line 2, *for* "Russell" *read* "Russel."

Page 127, line 23, *for* "March 4" *read* "March 3."

Page 216, line 4, *for* "No. 840" *read* "No. 843."

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 Haslingdon (*Institute*).
 Hastings (*Literary and Scientific Institution*).
 Hawarden (*Literary Institution*).
 Hebbden Bridge, near Todmorden (*Mechanics' Institution*).
 Helston (*Reading Room and Library*).
 Hereford (*Natural History, Philosophical, Antiquarian, and Literary Society*).
 Hertford (*Literary and Scientific Institution*).
 Heywood (*Mechanics' Institute*).
 Holbeck (*Mechanics' Institution*).
 Hollingwood (*Working Men's Club*).
 Holywell Green (*Mechanics' Institution*).
 Huddersfield (*Mechanics' Institution*).
 Hull (*Church Institute*).
 — (*Literary, Scientific and Mechanics' Institute*).
 — (*Lyceum Library*).
 — (*Royal Institution, Albion Street*).
 — (*Young People's Institute*).
 Huntingdon (*Literary and Scientific Institution*).
 Kendal (*Christian and Literary Institution*).
 — (*Working Men's Institute*).
 Kidderminster (*Mechanics' Institute*).
 Lancaster (*Mechanics' Institute and School of Science*).
 Leeds (*Church Institute*).
 — (*Library*).
 — (*Mechanics' Institution and Literary Society*).
 — (*Philosophical and Literary Society*).
 — (*Working Men's Institute*).
 — (*Young Men's Christian Association*).
 Leighton Buzzard (*Working Men's Mutual Improvement Society*).
 Leith (*Mechanics' Subscription Library*).
 Lewes (*Mechanics' Institute*).
 — (*School of Science and Art*).
 Lincoln (*Mechanics' Institute*).
 Liverpool (*Institute*).
 — (*Mechanics' Institute*).
 — (*Medical Institution*).
 — (*Polytechnic Society*).

Llanelli (*Chamber of Commerce and Reading Room*).
 London (*Athenæum Club, Pall Mall*).
 — (*Beaumont Institute, Mile End*).
 — (*Bedford Working Men's Institute, Spitalfields*).
 — (*Birkbeck Institution, Southampton Buildings, Chancery Lane*).
 — (*Bow Common Working Men's Club, Devon's Road, Bow Common*).
 — (*Christchurch Working Men's Club, New Street, Lark Hall Lane, Clapham*).
 — (*Clerkenwell Club, Lower Rosoman Street*).
 — (*Holloway Working Men's Club and Institute, Holloway Road*).
 — (*Literary and Scientific Society, Wellington Street, Islington*).
 — (*Literary and Scientific Institution, Waltham*).
 — (*St. James and Soho Working Men's Club, Rupert Street, Soho*).
 — (*St. Mary Charterhouse Working Men's Club, Golden Lane*).
 — (*South London Working Men's College, Blackfriars Road*).
 — (*Southwark Working Men's Club, Broadwall, Stamford Street*).
 — (*Spring Vale Institution, Hammersmith*).
 — (*Working Men's Club, Brixton Hill*).
 — (*Working Men's Club, St. Mark's, Victoria Dock*).
 — (*Working Men's Club and Institute Union, Strand*).
 — (*Working Men's Club and Institute, Battersea*).
 — (*Working Men's College, Great Ormond Street*).
 Loughborough (*Working Men's Club and Institute*).
 Madeley (*Anstice Memorial, Workmen's Club and Institute*).
 Manchester (*Athenæum*).
 — (*Law Library*).
 — (*Mechanics' Institution*).
 — (*Natural History Museum, Peter Street*).
 — (*Portico Library, Mosley Street*).
 — (*Royal Exchange Library*).
 Mansfield (*Co-operative Industrial Society*).
 — (*Mechanics', Artizans', and Apprentices' Library*).
 Melksham (*Mutual Improvement Society*).
 Merthyr-Tydfil (*South Wales Institute of Engineers*).
 Middlesborough (*Mechanics' Institution*).
 Modbury (*Mechanics' Institution*).
 Mossley (*Mechanics' Institute*).
 Newark (*Mechanics' Institute*).
 Newcastle-upon-Tyne (*Mechanics' Institution*).

Newcastle-upon-Tyne (*Working Men's Club*).
 New Mills, near Stockport (*Mechanics' Institute*).
 Newport, Isle of Wight (*Young Men's Society and Reading Room*).
 Northampton (*Mechanics' Institute*).
 Nottingham (*Free Library*).
 ——— (*Mechanics' Institution*).
 ——— (*Subscription Library*).
 Bromley House).
 Oldham (*Analytic Literary Institution*).
 ——— (*Mechanics' Institution, Werneth*).
 Ormskirk (*Public Library*).
 Oswestry (*Institute*).
 Patricroft (*Mechanics' Institution*).
 Pembroke Dock (*Mechanics' Institute*).
 Pendleton (*Mechanics' Institution*).
 Penryn (*Working Men's Club and Reading Room*).
 Perth (*Mechanics' Library, High Street*).
 Peterborough (*Mechanics' Institution*).
 Plymouth (*Working Men's Institute*).
 Poole (*Literary and Scientific Institution*).
 ——— (*Mechanics' Institute*).
 Portsea (*Athenæum and Mechanics' Institution*).
 Preston (*Avenham Institution*).
 ——— (*Society of Useful Knowledge*).
 Rawtenstall (*Mechanics' Institution*).
 Richmond (*Working Men's College*).
 Rotherham (*Rotherham and Masbro' Literary and Mechanics' Institute*).
 Royston (*Institute*).
 Ryde, Isle of Wight (*Philosophical and Scientific Society*).
 Saffron Walden (*Literary and Scientific Institution*).
 St. Just (*Institution*).
 St. Leonard's (*Mechanics' Institution*).
 Salford (*Working Men's Club*).
 Saltire (*Literary Institute*).
 Selby (*Mechanics' Institute*).
 Sheffield (*Branch Free Library*).
 ——— (*Literary and Philosophical Society, School of Arts*).
 Skipton, Yorkshire (*Mechanics' Institute*).
 Southampton (*Hartley Institution*).
 ——— (*Polytechnic Institution*).
 Southport (*Athenæum*).
 South Shields (*Working Men's Institute and Club*).
 Spalding (*Mechanics' Institute*).
 ——— (*Christian Young Men's Association*).
 Staines (*Literary and Scientific Institution*).
 ——— (*Mechanics' Institute and Reading Room*).

Stamford (*Institution*).
 Stourbridge (*Church of England Association*).
 ——— (*Iron Works Reading Room and Library*).
 ——— (*Mechanics' Institution*).
 ——— (*Working Men's Institute*).
 Stratford (*Working Men's Hall*).
 Sunderland (*Working Men's Club*).
 Swansea (*Royal Institution of South Wales*).
 ——— (*Working Man's Institute*).
 Tavistock (*Mechanics' Institute*).
 ——— (*Public Library*).
 Thornton, near Bradford (*Mechanics' Institute*).
 Thornton Heath, Croydon (*Workmen's Club*).
 Todmorden (*Mechanics' Institution*).
 Truro (*Cornwall County Library*).
 ——— (*Institution*).
 ——— (*Royal Institution of Cornwall*).
 Tunbridge Wells (*Mechanics' Institution*).
 ——— (*Society of Literature and Science*).
 Turton near Bolton (*Chapel Town Institute*).
 Twickenham (*Economic Museum*).
 Ulverston (*Temperance Hall*).
 Uttoxeter (*Mechanics' Literary Institute*).
 Wakefield (*Mechanics' Institute*).
 Watford (*Literary Institute*).
 Wells, Somerset (*Mechanics' Institution, Grove Lane*).
 ——— (*Young Men's Society*).
 Whaleybridge (*Mechanics' Institute*).
 Whitby (*Institute*).
 ——— (*Museum*).
 ——— (*Subscription Library*).
 Whitehaven (*Mechanics' Institute*).
 ——— (*Working Men's Reading Room*).
 Whitstable (*Institute*).
 Wisbeach (*Mechanics' Institute*).
 Wolverhampton (*Library*).
 Wolverton (*Institute*).
 Woodbridge (*Literary and Mechanics' Institute*).
 ——— (*Working Men's Hall*).
 Worcester (*Railway Literary Institute*).
 ——— (*Workman's Hall*).
 Workington (*Mechanics' Institution*).
 York (*Church Institute*).
 ——— (*Institute of Popular Science, &c.*).
 ——— (*Railway Library*).

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